The Automobile

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$29,469,588 Surplus for Chevrolet

Equal to 46% on $64,004,800 Stock—77,000 Cars Sold in 1916

NEW YORK, March 2—The Chevrolet Motor Co. during 1916 showed an increase in its surplus of $29,469,588, largely through the acquisition of stock of other companies. This increase is equal to 46.04 per cent on the $64,004,800 stock. Among the investments were 450,000 shares of common stock of the General Motors Corp. The net income from operations was $7,095,071, and current additions to surplus from the stock secured in the other companies, $22,374,517. The profit and loss surplus at the close of the year was $31,123,274. Approximately 77,000 cars were sold during 1916. This compares with 11,888 in the 4½-month period in 1915. It plans to produce this year from 100,000 to 125,000 cars.

The Chevrolet company has gone through a great development. Up to October last, the company had completed two new large buildings and had doubled the number of its workmen. The new

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Detroiters Plan 1000 Aeroplanes Yearly

DETROIT, March 3—A group of Detroit inventors, working in conjunction with T. W. Benoist of the Benoist Aeroplane Co., Sandusky, are planning the organization of a new company in Detroit to manufacture aeroplanes on a large scale. The Detroiters interested are P. W. Murphey, S. Smith and S. Peplenski, all expert mechanics employed in various automobile factories. The Benoist Co. is the second largest in America, being surpassed in output only by the Curtiss Co. The plan contemplated is to combine the Benoist aeroplane specifications with a new eighteen-cylinder, cam-driven, 120-hp. engine developed by the Detroit men, as mentioned in a previous issue of THE AUTOMOBILE. It is hoped to manufacture at least 1000 planes per year in the Detroit factory. The new planes will carry from two to eight passengers and sell at prices ranging from $5,000 to $11,000. If the company can be organized within the next month and a plant built in time, it is planned to compete for a part of the government business incidental to aeronautic preparedness. The company also plans to operate the passenger and mail transportation system between Detroit and Cedar Point.

Kissel Twelve at $2,250

NEW YORK, March 2—The Kissel Motor Car Co. will start active production of its twelve in about 2 weeks. The car will sell at $2,250 for the regular touring bodies, and $2,650 with the All-Year Sedan.

The motor will be 2⅞ by 5, with overhead valves. Other features include force-feed oiling, multiple disk clutch, Delco ignition, Stromberg carbureter, both internal expanding and external contracting brakes, underslung ¾ elliptic rear springs, vanadium springs on both front and rear, Goodyear tires, and Firestone demountable rims, with two extra rims.

Dowse Organizing Big Rubber Co.

MILWAUKEE, WIS., March 3—The organization of a new rubber and tire interest of large proportions in the Middle West by Byron C. Dowse, former president of the Federal Rubber Mfg. Co., Milwaukee and Cudahy, Wis., which now is owned by the Fisk interests, is reported in Milwaukee. It is stated that Mr. Dowse is forming the Dowse Rubber Co. of Illinois, but further than this no details can be learned. He formerly was one of the chief owners of the G. & J. Rubber Co., Indianapolis, and is known as one of the most practical and successful tire manufacturers in the United States.

Studebaker Profits $8,611,245

Net Sales in 1916 Total $61,988,594—65,885 Automobiles Sold

SOUTH BEND, IND., March 5—Net profits of the Studebaker Corp. in 1916 were $8,611,245 on net sales of $61,988,594. The margin of profit of sales thus was 13.89 per cent. The company sold 65,885 automobiles, an increase of 19,000 over the previous year. After deducting the preferred dividend there remained 26.14 per cent for the common, of which 10 per cent was distributed in dividends and the balance of 16.14 per cent or $4,843,695 was added to surplus account, which, with the surplus reserve accounts, show credits equal to 57.40 per cent of the outstanding common stock. The book value of the common stock Dec. 31, 1916, excluding good will, was $91.38 per share. It is quoted on the Stock Exchange at $100.25 to $100.50.

Stress is laid by the annual statement that the company's regular business has shown substantial development the last year and it is now independent of war orders. No war orders were received during the year. Some, however, of the previous year were completed with a return of $49,392 net profit on sales of $2,791,936. These figures compare with war orders of $13,553,611, returning a net profit of $3,412,112 in 1915, which accounts for the total net profits last year being somewhat less than 1915.

A marked reduction in the margin of profit in these orders is shown. This profit in 1915 was about 23 per cent on the total war orders. In 1916 the profit on the war orders that were completed was only about 2 per cent.

Assets Triple Liabilities

Net profits on regular business increased nearly $3,000,000 while on the

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Four Car Makers Raise Prices

Studebaker, Kissel, Cole and Jackson Announce Increases of from $50 to $100

DETROIT, March 5—Beginning to-day, the Studebaker Corp. has increased its prices $55 per car on four-cylinder roadsters and $80 per car on six-cylinder roadsters and $70 on six-cylinder touring cars, the increase taking immediate effect.

Kissel Prices Advanced

NEW YORK, March 2—The Kissel Motor Car Co. yesterday advanced $50 on the 642 models and $100 on the Hundred Point six models. The touring sedan now sells at $1,735; the Hundred Point six touring car at $1,295, and the De Luxe 6-42, seven-passenger, at $1,750.

Cole to Advance Prices $100

INDIANAPOLIS, Ind., March 2—The Cole Motor Car Co. will advance $100 on April 1. Present prices are $1,695 for the touring car and the Tuxedo roadster, $2,295 for the Toursedan and the Tourcoupe.

Jackson Raises Price $100

JACKSON, Mich., March 1—The Jackson Automobile Co. has increased its prices $100 on its 349 models, except the Sedan which remains at $1,995. The two-passenger model now sells at $1,395; the five-passenger at $1,395; the seven-passenger at $1,495; and the detachable top model at $1,605.

New Ohio Electric Model

NEW YORK, March 2—Ohio Electric Car Co. will bring out a new model 44, built on the same chassis as the model 63 but with a different type of body and single control. This new model sells at $2,380, f.o.b. Toledo.

Goodrich and Diamond Tire Prices Higher

NEW YORK, March 5—Although it was rumored last week that there would be a general rise in tire prices, a majority of the tire companies are holding back any such move, thus making last week's tension and excitement all the more keen. As the list now stands, Fisk, Goodrich and Diamond fabric shoes are moderately higher, from 2 to 11 per cent, with the Ford sizes on the lower end, the unusual sizes next, and the usual sizes last.

A peculiar situation has risen in regard to the expected tire rise. It is stated that fabric prices are over 100 per cent higher now and are practically responsible for the increase. Rubber is plentiful and at a reasonable price. But wages are high and employees and shipping cars are scarce, so that it is hard for the makers to get material to the plants. Cotton is scarce, that is the grade needed for tire manufacture. The makers are now bidding heavily on Egyptian cotton, because of the scarcity of the Sea Island grade grown along the coast of North and South Carolina. It is expected that several big crops will come from Texas suitable for tire manufacture, so that the present tension will let up.

None of the companies have raised their prices on cord or solid tires. The Goodrich schedule on fabric casings is now $11.65 for the 30 by 3, formerly $11.35; $15.10 for the 30 by 3½ formerly $14.70; no increase in the $17.70 price for the 32 by 3½; $25.30 for the 34 by 4, formerly $24.60; $36.25 for the 36 by 4½, formerly $34.20.

A slight increase was also made on the tubes which are now priced at $2.75 for the 30 by 3, formerly $2.70; $3.40 for the 30 by 3½, formerly $3.05; $3.50 on the 32 by 3½, formerly $3.40; $4.70 on the 34 by 4, formerly $4.25; and $6.05 on the 36 by 4½, formerly $5.60.

Three Sunbeams for Indianapolis

Rickenbacher To Drive

LONDON, ENG., March 7—*Special Cable*—Three Sunbeam racing cars will represent the English factory at the Indianapolis sweepstakes May 31. These cars will be driven by Christiaens, Rickenbacher and Van Raalte.

The decision of the Fiat company in regard to sending two cars to Indianapolis is still pending, but is considered very likely to be favorable. W. F. Bradley, European correspondent of THE AUTOMOBILE, who has been instrumental in securing the cars, expects that they will start in the race. It is expected that the drivers for these Italian cars will be Jack Scales and Enrico Cago, who won renown when he captured the Targa Florio cup.

Causan Resigns from Chalmers

DETROIT, March 5—Nemorin Causan, the French automobile engineer, who has been employed in the drafting room of the Chalmers Co. recently, has resigned his position and will leave America. Mr. Causan suffered a severe illness from gas while serving in the European war, and will return to France for medical treatment. He is the designer of many famous racing cars and was formerly editor of the *Technique Automobile*.

Fisk Tire Earns $1,741,704

Surplus of $1,875,442—Net Profits $1,836,830 Equal to 16 Per Cent on Common

CHICOPEE FALLS, Mass., March 1—Earnings of $1,741,704 were made by the Fisk Rubber Co. for the year ended Dec. 31, last. The company paid out in dividends $448,000, which after being paid left a surplus of $1,875,442, an increase from $1,246,394. Total sales for the year were $19,457,789.

The profit and loss account as of Dec. 31, 1916, shows: Net profits after deducting manufacturing costs, depreciation and interest on borrowed money, $1,836,830; less unusual expenses absorbed, $95,125; total $1,741,705; surplus balance, Dec. 31, 1915, $1,246,394, making the total $2,988,099. Total deductions amounted to $1,112,657, leaving a surplus balance Dec. 31, 1916, of $1,875,442.

The balance sheet as of Dec. 31 last shows: Capital assets, $13,876,308; investments, $404,342; current assets, $13,255,624; deferred charges, $260,478; total assets, $27,796,753.

Capital stock outstanding, $21,900,000; current liabilities, $2,874,543; reserve accounts, $171,768; surplus appropriated for retirement first preferred stock, $975,000; surplus for attached statement, $1,875,442; total liabilities, $27,796,753.

The officers and directors were re-elected except J. D. Anderson, who is a new addition to the board of directors.

The statement of earnings follows:

	1916	1915	Changes
Net profits	†$1,836,830	$1,791,579	Inc. $45,251
Other exp's.	95,125	.....	Inc. 95,125
Invent'ry res.	.....	145,000	Dec. 145,000
Pfd. divids.	448,000	359,042	Inc. 88,958
Balance	*1,293,705	1,287,537	Inc. 6,168
1st pf. s'k ret.	375,000	600,000	Dec. 225.000
1st pf. prem.	7,941	10,210	Dec. 2,269
Misc. exp.	16,866	.....	Inc. 16,866
Commissions	‡264,850	50,200	Inc. 214,650
Surplus	629,048	627,127	Inc. 1,921
Prev. surplus.	1,246,394	619,267	Inc. 627,127
P. & L. sur.	1,875,442	1,246,394	Inc. 629,048

†After deduction of manufacturing costs, depreciation and interest.

*Equal to 16.17% on $8,000,000 common stock, compared with 16.1% earned on same stock in 1915.

‡Commissions paid on sale of preferred stock.

Graham Now Pierce Commercial Mgr.

BUFFALO, N. Y., March 5—C. W. Graham has been appointed commercial manager of the Pierce-Arrow Co. of this city. Mr. Graham was formerly connected with the Willys-Overland Co.

Brooks Marmon Assistant Sales Mgr.

INDIANAPOLIS, March 1—H. H. Brooks has been appointed assistant sales manager of the Nordyke & Marmon Co. He was formerly connected with the Marathon Motor Car Co., Nashville, Tenn.

Pacific Coast States Prosperous

Reeves Reports Healthy Condition—Large Tourist Travel Due to Good Roads

NEW YORK, March 5—Alfred Reeves, general manager of the National Automobile Chamber of Commerce, has returned from a 6 week's trip to the Pacific Coast where he investigated trade conditions and opened the San Francisco show on behalf of the automobile manufacturers.

The Pacific Coast states are in a normally prosperous condition on account of the shipbuilding activities, the big fruit crops and the large tourist travel. The automobile trade is prosperous on account of the railroad fares being higher and on account of the fine roads. The dealers are working together and are financially in good condition. Practically every car made is represented on the Pacific Coast. On account of the good weather and the all-year sales on the Western coast, the automobile trade there is always brisk. As a result of these conditions, the heavy overhead expenses of the Eastern dealers are done away with.

The Western agencies are experiencing the same shortage of freight cars and as a result the dealers are sold away ahead.

The San Francisco automobile show was a great success, not alone in attendance but in business done. The dealer organizations on the coast show unusual enterprise in their work of handling and selling cars and in association with the American Automobile Assn. and clubs, are keen to do everything necessary to make enjoyable the touring trips of those who visit the coast territory. California is more crowded with tourists this year than ever before in its history.

Many of the automobile sales on the Western coast are being made through the part payment plans. In fact, the number of sales is so large that legislation is being passed to protect the dealers, such as giving them a lien on the cars sold this way, and demanding insurance on each car.

Notwithstanding the fact that there is now a car for every thirteen persons, California continues to make new records in automobile sales. In Los Angeles county, Mr. Reeves states, there are more cars than any other county in the country and judging by the traffic condition in Los Angeles, it has more cars per miles of street than New York or any other city.

California this year has appropriated $15,000,000 for roads, which, added to the present mileage, will even further enhance the present ideal touring conditions.

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Continental To Prove Assets

Meets 6 Per Cent Dividend Order

DETROIT, March 7—*Special Telegram*—The Continental Motor Corp. has notified the Michigan Securities Commission that it will comply with its order that the company declare only 6 per cent dividends until the intangible assets of $10,265,000 have been reduced to $5,000,000. The company did not have all available facts at its original hearing, which caused the issuance of this order. The company is now having appraisals made and these will show assets of $3,500,000 more than the books show and in due time, probably about 6 months, the company will ask for a rehearing and will present all the facts pertaining to its finances.

Jan. Exports 6073 Vehicles

4733 Cars and 1340 Trucks Shipped Abroad—Parts Worth $2,194,312

Mos.	Cars	Value	Trucks	Value	Parts
Jan. 1917	4733	3,860,224	1340	3,515,210	2,194,312
Dec. 1916	4911	$3,658,650	1330	$3,688,314	$1,755,335
Jan. 1916	4520	3,044,995	1269	3,416,818	1,800,621

WASHINGTON, D. C., March 5—Automobile exports in January dropped in number but gained in value over December, while trucks gained in number and dropped in value. The total exports for January, 1917, amounted to $9,569,746, compared with $9,102,299 in January, 1916, and $8,262,434 in December, 1916.

Despite the fact that the German submarine policy was responsible for the sinking of many ships in January, the United States managed to send over 465 cars and trucks to France, valued at $1,123,877. France was our second largest buyer in January, being surpassed only by the United Kingdom, which imported 801 of our cars and trucks valued at $1,888,360. Both France and the United Kingdom, however, imported fewer cars in January than in December on account of the submarine warfare.

Though there was a drop in the figures for two of our leading buyers, South America, the West Indies, the British East Indies and Australia brought forth new marks in the way of automobile imports. American automobile imports to those countries alone totaled $1,099,550 in January.

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Willys on 30-Day Vacation

NEW YORK, March 6—John N. Willys, president of the Willys-Overland Co., is taking a 30-days' vacation. He will leave this city this week for the south.

Exports of Automobiles, Trucks and Parts for January and 6 Previous Months

	January				Six Previous Months			
	1916		1917		1916		1917	
	Number	Value	Number	Value	Number	Value	Number	Value
Passenger cars	4,520	$3,044,995	4,733	$3,860,224	27,376	$21,471,078	33,531	$25,351,131
Commercial cars	1,269	3,416,818	1,340	3,515,210	12,391	32,559,354	10,113	28,722,972
Parts, not including engines and tires	.....	1,800,621	.....	2,194,312	.....	12,791,951	.....	14,650,217
Total	5,789	$8,262,434	6,073	$9,569,746	39,767	$66,822,383	43,644	$69,024,320
By Countries								
Denmark	105	$80,687	90	$61,670	442	$296,437	1,096	$818,989
France	521	1,358,115	465	1,123,877	3,172	7,993,295	3,825	11,900,999
Germany	.....	.....	.....	.....	.....	.....	.....	.....
Italy	19	24,173	10	3,400	184	127,586	73	46,149
Russia in Europe	151	338,324	175	373,308	3,261	12,824,047	2,220	5,718,720
United Kingdom	1,090	1,718,886	801	1,888,360	13,571	18,614,667	2,451	1,789,596
Other Europe	116	100,372	344	424,872	659	673,928	4,052	9,719,875
Canada	862	581,563	875	702,193	3,340	2,440,316	3,045	2,270,742
Mexico	39	42,154	96	67,340	169	168,316	5,132	4,245,995
West Indies	266	187,339	374	366,154	2,170	1,345,896	516	387,578
Argentina	576	245,376	227	154,117	2,255	985,535	3,557	2,571,505
Brazil	24	15,069	84	40,543	110	66,056	2,567	1,520,179
Chile	69	40,935	238	170,533	486	338,094	354	206,609
Venezuela	30	18,452	44	25,583	277	184,175	1,254	846,309
Other South America	44	25,290	201	115,753	254	146,834	333	224,436
British East Indies	399	286,872	614	420,036	1,629	1,230,243	928	574,260
Australia	576	441,306	291	230,262	3,407	2,806,256	3,341	2,415,047
Other Asia and Oceania	551	685,391	887	1,034,442	1,727	2,370,204	3,309	2,417,073
Other countries	351	271,509	257	172,991	2,654	1,418,547	5,591	6,391,042
Total	5,789	$6,461,813	6,073	$7,375,434	39,767	$54,030,432	43,644	$54,065,103

U. S. Rubber Profits $15,796,389

Net Income in 1916 Was $10,398,195—Surplus on Common 15 Per Cent

NEW YORK, March 6—The United States Rubber Co. reports gross sales in 1916 amounting to $126,759,000, a gain of $33,898,000, or 36 per cent over the preceding year. The cost of manufacture, selling, general expenses and taxes was $110,962,739, leaving operating profits of $15,796,389. The net income amounted to $10,398,195 and the total dividends amounted to $4,955,082, leaving a surplus for the common on Dec. 31, 1916, of $5,443,112, equal to slightly more than 15 per cent on the outstanding shares. Adding in the surplus for the beginning of the year of $22,962,321 and $73,700 gained in the conversion of the second preferred into the first preferred left a surplus of $28,479,134.

The net profits of the business for 1916, before deducting interest charges, amounted to $14,743,000; after deducting interest charges the profits were $11,226,000. These profits cover the dividends upon the preferred stocks and enhance the intrinsic value of the common stock.

The company is now provided with funds wherewith to pay its entire debt and the debts of the subsidiary companies, with the exception of $9,000,000 General Rubber Co. debentures, due Dec. 1, 1918, and $2,600,000 Canadian company bonds, due Oct. 1, 1946. This condition is due by the issue of $60,000,000 first and refunding 5 per cent mortgage bonds, brought out by Kuhn, Loeb & Co.

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Three New N. A. C. C. Members

NEW YORK, March 7—Three new members were elected to the National Automobile Chamber of Commerce at its regular monthly meeting here to-day. They are the Moreland Motor Truck Co., Los Angeles, Cal., the Commerce Motor Truck Co., Detroit, and the Stewart Motor Car Corp., Buffalo, making a total membership of 101.

The association went on record as endorsing and being in favor of the National Industrial Conference Board, in presenting before the different legislatures the business man's side of important industrial, legal and other matters. This industrial board includes nearly all the important industrial associations. Mr. Reeves reports that all records in point of attendance and business done were broken at the Chicago and New York shows. The Export Department was definitely decided upon and steps toward further organization will be taken up at to-morrow's meeting. The traffic report shows the worst shipping tieup the automobile industry has ever had. It is expected, however, what with improved weather, and more co-operation on the part of the dealers, the situation will be relieved.

Several of the railroads are adding new automobile freight cars. The New York Central is adding 1000 new automobile freight cars and another big road has 2000 more which will soon be ready.

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Republic Trucks Get Control of Torbensen Axle

NEW YORK, March 5—The Republic Motor Truck Co. has obtained control of the Torbensen Axle Co., the purchase bringing to the truck company control of all patents on internal gear axles.

The stockholders of the Republic company have authorized an increase in the common stock from 62,500 shares to 100,000 shares without par value. Of the increase voted, 13,825 shares will be issued immediately to purchase the Torbensen company.

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Oneida Trucks in Four Types

GREEN BAY, WIS., March 3—The Oneida Motor Truck Co., Green Bay, Wis., organized last week with a capital stock of $300,000, intends to engage in the manufacture of motor trucks under the trade name of "Oneida" on its own account, and will have no connection with the Menominee (Mich.) Motor Truck Co., as previously intimated.

Will Make G. M. C. Castings

Durant a Director in Saginaw Malleable Iron Co.—12,000 Tons of Iron a Year

SAGINAW, MICH., March 2—The Saginaw Malleable Iron Co., in which W. C. Durant is a director and which was incorporated recently as told in a previous issue of THE AUTOMOBILE, will manufacture malleable iron castings, principally for the General Motors Co. C. F. Drozeski, in a statement, told that the plant is being constructed to allow room for expansion to four times the original size. The initial capacity will be about 12,000 tons of malleable iron per year. If this is increased four times the first size, a capacity of 48,000 tons a year will be possible, and this is just about the present requirement of the General Motors Co., which, according to Mr. Drozeski, will take most of the output.

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Nairn Gurney Sales Manager

NEW YORK, March 2—Alex K. Nairn has become sales manager of the Gurney Ball Bearing Co., Jamestown, N. Y. He formerly occupied a similar position with the Hess-Bright Co. T. T. Fauntleroy has become the New York branch manager of the Gurney company. He was formerly with the Pathfinder.

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Maise Resigns from Springfield Body

DETROIT, March 3—Herman Maise, chief engineer of the Springfield Body Co., has resigned his position.

U. S. RUBBER CO. AND SUBSIDIARIES—CONSOLIDATED INCOME STATEMENT FOR YEAR ENDING DEC. 31, 1916.

Net sales, footwear, tires, mechanical and miscellaneous		$126,759,129.11
Less:		
Cost of manufacture, selling, general expenses and taxes		110,962,739.76
Operating profits		$15,796,389.35
Other income (net)		2,442,815.08
Total income		$18,239,204.43
Less:		
Cash discount allowed customers for prepayment (net)	$2,733,104.72	
Deductions for bad debts	314,443.84	
Federal income tax, 1916	447,881.64	
		3,495,430.20
Net income prior to interest charges		$14,743,774.23
Interest on loans, notes and accounts payable		1,248,618.42
		$13,495,155.81
Interest and discount on funded debt		2,268,947.14
Income for the year		$11,226,208.67
Income charges applicable to period prior to 1916		828,013.32
Net income		$10,398,195.35
Dividends—United States Rubber Co.:		
1st Preferred, 8 per cent	$4,810,284.00	
2d Preferred, 56 per cent	25,560.00	
	$4,835,844.00	
Dividends to minority stockholders of subsidiary companies	119,238.50	
		4,955,082.50
Surplus for period		$5,443,112.85
Surplus beginning of period		$22,962,321.79
Additions to surplus:		
Capital gain in conversion of Second Preferred into First Preferred stock	73,700.00	
		23,036,021.79
Surplus, Dec. 31, 1916		$28,479,134.64

Dunham Perfects Tractor

S.A.E. President Designs Farm Machine—Capitalists To Form Company

DETROIT, March 5—George W. Dunham, recently elected president of the Society of Automobile Engineers, has perfected a farm tractor that will probably be placed on the market in the near future. It is reported that Mr. Dunham's tractor has proved so successful in its test as to interest many prominent capitalists, and it is probable that a company will make and market the tractor in the near future.

Mr. Dunham designed the first Hudson car, had a prominent part in developing and perfecting the four-cylinder motor of the Oldsmobile, and later was the head of the engineering department of the Chalmers company, where he was vice-president in charge of engineering, and director. He has operated as a consulting engineer for the past 2 years, but has devoted most of his time to the study of the tractor, and Detroit engineering workers believe that with his vast experience he is likely to set a new standard in this field.

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Macneale Corcoran Victor General Mgr.

CINCINNATI, Ohio, March 1—Neil Macneale will assume general management of the Corcoran Victor Co., lamp maker. Mr. Macneale is former owner of the Toledo Electric Welder Co. He has also acquired a substantial interest in the company's common stock and has also been elected to the directorate.

G. A. Sawyer, of Channer & Sawyer, resigned from the executive committee of the company, and Mr. Macneale was elected to succeed him. The other members of the committee are T. J. Corcoran and E. W. Edwards.

Other officers and directors remain as follows: E. W. Edwards, president; T. J. Corcoran, vice-president, with W. Y. Cartwright, W. P. Anderson, R. E. Field, Harvey Corcoran, G. A. Sawyer and T. L. Crothers, directors.

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Detroit Aero Club Elects Governors

DETROIT, March 6—The Aero Club of Detroit held its annual luncheon and meeting yesterday and lowered its membership fee, besides electing a board of governors.

The newly elected governors are A. Vervilli of the General Aeroplane Co.; G. W. Dunham, consulting engineer; W. B. Stout, aeroplane engineer of the Packard Motor Car Co.; K. C. Zimmerschied of the General Motors Co.; D. McCall White, engineer of the Cadillac Motor Car Co.; R. O. Gill, manufacturer and manager of the Saxon Motor Car Co., and R. W. Judson, vice-president of the Continental Motors Co.

Other officers of the club, elected at a recent meeting of the board of governors, are: Sidney D. Waldon, president; Henry B. Joy, vice-president; Fred M. Alger, vice-president; R. D. Chapin, treasurer, and Mason P. Rumney, secretary.

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Court of Appeals Holds Kardo Front Axle Patent Valid

CINCINNATI, OHIO, March 1 — The Kardo front axle patent has been upheld by the United States Circuit Court of Appeals which has declared it infringed by upholding the validity of claim 1 of the patent, No. 753,820, granted March 1, 1904, to W. C. Baker. Accordingly the decree of the lower court, in the suit of the American Ball Bearing Co. against E. B. Finch, former Cleveland Chalmers representative, must be reversed and the record remanded. The decision of the lower court held the Baker patent void, upholding the prior art claims of the defense. The American Ball Bearing Co. appealed to the higher court.

The patent has to do solely with the means for mounting and turning the front or steering wheels of an automobile. Claim 1 reads: "In combination with the spindle and the hub, two sets of balls interposed between said spindle and the hub adjacent the ends thereof, said balls being of different sizes, the larger of said balls being located in line with the traction and tread of the wheel, and a steering knuckle carried by said spindle in juxtaposition to the larger balls."

License arrangements under the patent remain unchanged. The company is one of the owners of the Kardo Company, organized by the Packard Motor Car Co., the Peerless Motor Car Co. and the American Ball Bearing Co. to hold their axle patents and to defend them in court.

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Brown Now Goodrich Treasurer

AKRON, OHIO, March 1—L. D. Brown, cashier of the First-Second National Bank of this city, has resigned to become treasurer of the B. F. Goodrich Co., succeeding W. A. Means, who has become vice-president. Mr. Brown will remain a director of the several Akron banks in which he is interested.

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Jackson Tractor Sales Manager

CHICAGO, March 1—Fred W. Jackson, Holland, Mich., who is a pioneer in the automobile industry, has been appointed territorial sales manager for the Ebert-Duryea Farm Tractor Co., Chicago. The company was recently organized to manufacture a two-wheeled farm tractor.

Palmer Develops New Tire

Cord Tire Inventor Forms Company at St. Joseph With $500,000 Capital

CHICAGO, March 5—John F. Palmer, Riverside, Ill., inventor of the cord idea in pneumatic tires, has organized a company for the manufacture of his latest development in this type of tire. The factory is at St. Joseph, Mich., has 70,000 sq. ft. area and is of modern construction. The concern is called the Palmer Tire & Rubber Co., and will manufacture the Palmer flat, cable, cord tire, a new development of the cord construction. A new tube of Palmer design also will be manufactured. Mr. Palmer's 23 years of experience in this field promises interesting construction. The company is capitalized at $500,000, and the officers are as follows: J. F. Palmer, president; C. W. Bully, Chicago, vice-president; W. E. Bryan, Chicago, secretary; M. D. Wilbur, treasurer.

G. H. Bird, of the Bird Sykes Co., Paige distributers, Chicago, is manager of salesmen.

C. W. Bully was formerly president of the Mercury Mfg. Co., Chicago, and recently resigned from that company to take charge of the manufacturing department of the new factory.

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$278,219 Net Profits for Stromberg

CHICAGO, March 5—Net profits in 1916 of $278,219, equal to $5.56 per share on the 50,000 shares outstanding were made by the Stromberg Carburetor Co. of America. These compare with $153,666 in 1915. Net sales in 1916 totaled $1,208,443, compared with $868,076 the previous year. The net profit on sales in 1916 was 23.02 per cent, as against 17.70 per cent in 1915.

Charles W. Stiger, president of the company, in his remarks to the stockholders, says: "The number of unfilled order on our books as of Jan. 1, 1917, compared with Jan. 1, 1916, showed an increase of 82 per cent, indicating that this should be the largest and most profitable year in our history."

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Warner Takes Over Menhall's Holding

BELOIT, WIS., March 3—A. P. Warner, Beloit, Wis., of Warner Auto-Meter fame, and for several years manufacturing the Warner Auto-Trailer, becomes sole owner of the business of the Warner Mfg. Co., Beloit, by the purchase of the interest of James W. Menhall, who has been vice-president of the company. Mr. Menhall will devote his attention to his extensive automobile distributing and dealer interests.

Tire-Machine Suit on Appeal

Seiberling-Stevens Patents Are Basis of Suit Between Goodyear and Firestone

AKRON, March 5—The suit of F. A. Seiberling and the Goodyear Tire & Rubber Co. against the Firestone Tire & Rubber Co. will be tried on appeal in the U. S. Court of Appeals at Cincinnati this week. Mr. Seiberling and the Goodyear company won a decision in the U. S. district court in Cleveland, Goodyear establihsing its contention that the invention of a machine to build tires, replacing hand-made tires was a pioneer invention and that no other company could build machine tires without arranging with the plaintiffs.

The Firestone Tire & Rubber Co. has a machine of its invention and is carrying an appeal on the ground that its type of machine is not a patent infringement.

The patents involved in the suit are numbers 725,135 and 726,561, covering the Seiberling-Stevens tire-making machinery. Mr. Seiberling and the Goodyear company contend that the Seiberling-Stevens machine of 1902-1903 was the pioneer and that it paved the way for the present-day semi-automatic tire-making machine. A number of the tire manufacturers have been building their tires on machines licensed under these patents, but Firestone refused to take out such a license, claiming that its machines do not infringe patents.

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Hayes Wire Wheel To Be Marketed by Castle & Kyte

JACKSON, MICH., March 6—Hayes Wheel Co. this city has entered the wire wheel field with Fred E. Castle and H. W. Kyte as general sales agents with headquarters at 872 Woodward Avenue, Detroit. The wire wheels are manufactured in a special plant devoted exclusively to this purpose. One of the features of the wheel is the manner in which the shell is safeguarded against undue wear of drive studs when the hub caps are not securely tightened. Closed bosses have been provided to eliminate wear and the drive studs are concealed preventing rust.

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Barber Sues Reo in Michigan

DETROIT, March 7—Suit has been brought against the Reo Motor Car Co., Lansing Mich., by William Barber, an inventor, of Brooklyn, N. Y., for infringement of a patent referring to a valve mechanism as used by the Reo company. The patent refers to a valve design in which a screwed-in valve cage is used, and where there is an arrangement for swinging the valve mechanism to the side so as to permit of removal of the valve cage with the valve without disassembling the valve-operating mechanism.

The case up to the present has been tried in the Courts of New York State. The first suit was tried over a year ago and a decision rendered against a Reo dealer in New York State. In the appeal Reo lost. The present suit has been brought in Michigan for the apparent purpose of reaching Reo in its home. The present suit asks for a permanent injunction restraining Reo from using Barber's mechanisms and demands $2 each for every valve used by Reo in the last 6 years. This royalty it is said would amount to $1,500,000. The original suit in New York State was brought against a Reo dealer. At that time Charles E. Duryea, Counsel Brannigan of the N. A. C. C. and others up in automobile matters were called as witnesses.

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Dunn Resigns Overland Vice-Presidency

TOLEDO, March 3—Harry T. Dunn, vice-president of the Willys-Overland Co., has tendered his resignation to the board of directors of the company. His resignation is effective May 1.

Mr. Dunn, who is president of both the Fisk Rubber Co. and the Federal Rubber Co., found it necessary to devote all of his time to the rubber interests. He has been associated with the Fisk Co. since its inception. Mr. Dunn will remain a director of the Willys-Overland Co.

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Bartsch Leaves Bosch—Joins Advertising Agency

NEW YORK, March 5—Alfred H. Bartsch, who has been advertising manager of the Bosch Magneto Co. for the past 7 years, has resigned. He has entered the McLain, Hadden, Simpers Co. advertising agency and will be secretary of the company. He is succeeded in the Bosch company by R. S. Westcott who has been assistant advertising manager.

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Van Alstyne Heads Advertising Agency

NEW YORK, March 6—T. B. Van Alstyne, formerly advertising manager of the Class Journal Co., has become president of Ewing & Miles, advertising agents, Times Building, New York City. Fred J. Wagner, well-known automobile race starter, has associated himself with the company as secretary. C. A. Williams, formerly connected with the advertising business in Chicago, is vice-president.

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Brown Elgin Sales Director

CHICAGO, March 1—Will H. Brown has become director of sales of the Elgin Motor Car Corp. He was formerly vice-president and assistant general manager of the Willys-Overland Co.

Goodyear Sales 70% Better

$100,000,000 Volume for 1917 Possible—Will Add to Plant —$9,000,000 Stock Issue

AKRON, March 1—The Goodyear Tire & Rubber Co. will issue $6,000,000 in 7 per cent cumulative preferred stock and $3,370,000 common stock. The preferred has been sold to bankers, headed, it is understood, by Borton & Borton of Cleveland.

When the new shares have been issued the company will have outstanding $23,500,000 preferred stock and $20,870,000 common. According to President F. A. Seiberling, sales are running 70 per cent ahead of last year. If this continues it will mean a $100,000,000 volume for the fiscal year ending Oct. 31, 1917, compared to $63,950,000 in 1916.

Last year the company put a very large amount of money into plant extension. In order to keep pace with its growth and to be ready to purchase and carry adequate amounts of raw material as is found desirable, the Goodyear people will offer the new stock.

It is not made public at this time at what price the new preferred will be placed on the market. The new common, however, will be offered at par to holders of common stock of record Feb. 20 in the proportion of one new share for each five held.

Last year when Goodyear stockholders increased the authorized capitalization they placed the matter of sale of all of the new stock in the discretion of the board. The preferred now to be issued was then authorized and stockholders will not need to be asked to sign waivers permitting sale of the new preferred direct to bankers.

Although the worth of rights at this writing cannot be determined, it should range between $23 and $30.

—

May Again Build Remington Cars—Plan $1,050 Car

NEW YORK, March 5—There is a strong probability of the revival of the Remington company, which was organized a few years ago for the manufacture of automobiles, under the name of Remington Motors, Inc., with temporary offices at 100 Broadway, in the office of W. Morton Hetzell, a financial organization. The new Remington is expected to list at approximately $1,050 and will use a Wisconsin engine. Negotiations are at present on for securing a factory for assembly purposes. A complete organization has not been effected, but a few officers have been selected. David Rheinhol will be engineer. Factory work will be in charge of E. H. Chappell.

Crops in Argentina Below Normal

Wheat, Flax and Corn Yields Poorest in Years—U. S. A. Shipments Late

ROSARIO, ARGENTINA, Jan. 25—Farming conditions in this section of the Argentine Republic are at a low ebb.

Rosario is the grain center of Argentina, just as Chicago is the meat center of the United States, or Minneapolis the great grain shipping center of the American Northwest. Grain shipments from Rosario are greater than from Buenos Aires.

The crop which has just been harvested has not been satisfactory. Flax was nearly a failure; wheat was scarcely 50 per cent that of a year ago; and if present hot dry weather continues, the corn crop will be the poorest in years and Argentina will be facing the hardest times it has ever seen. Such a condition is of course only temporary because in a land of such great fertility of soil good crops are bound to come.

Grain Elevators Needed

The value of crops is heavily reduced in Argentina because of the poor system of handling the grain. There is not a system of grain elevators throughout the country as there is in the United States, Canada, and Australia. Argentina is much in need of such a system. To-day the grain is sacked at the farm and piled in huge stacks at the railway depots. These stacks are covered with canvas and frequently the grain remains in them for months. The loss due to storing it in this way is very heavy. If the weather is dry the loss is relatively slight, but in wet weather it is particularly heavy.

The farmers have not been reaping as great a benefit due to the increase in prices due to the war as they should have. The dealers reaped the big profit. They purchased the corn for 2 and 3 pesos per quintal and later when it went up to 11 pesos per quintal all of this profit went to the dealer.

Sales Slow in Rosario

This temporary setback in farming conditions makes the automobile business around Rosario very slow. The city of Rosario is stocked with European cars, many of which are in storage in garages due to the high price of fuel and financial depression due to lack of ships. This has made it particularly hard for many new makers from the U. S. A. who have come here within the last few months. It seems that these makers will have to stand their loss for a year or so. The market prospects here are good, and just as in the Western States when there is a bad crop, business slows down, but only temporary, so it is here.

Automobile factories in the United States aiming at developing the business here in the next year must arrange to make more prompt shipments of automobiles. There is too much delay in shipments from several factories. Many times the goods are not properly packed and money has to be spent here before the vehicles go into commission. Dealers here have suffered very severely from lack of shipments. Such business methods are seriously injuring the American car business around Rosario at present.

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Owner Is Liable for Chauffeur's Acts

NEW YORK, March 1—A decision has just been handed down here which states that an owner of an automobile may be held responsible for a killing even though its chauffeur takes the car without his permission and maims or kills a person. The case was tried in the Appellate Division of the Supreme Court. The Defendant, the owner, argued that since the car was in dead storage and was taken out without the owner's permission he should not be held responsible. The plaintiff contended that since the chauffeur was in the employ of the owner, while testing his car, the latter is liable, notwithstanding the fact that the driver was given orders not to take the car out as the car was in good condition.

The decision holds that an owner is liable for acts done by his chauffeur in the course of his employment as such, but mere disregard of instructions or deviation from the line of his duty does not relieve the owner from the responsibility. The important point brought out in the case was whether the act was done while the chauffeur was doing his owner's work, no matter how irregularly or with what disregard of instructions.

As the case now stands, where a car is entrusted to a chauffeur's discretion an employer may be responsible for tests undertaken without positive orders.

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Waldon Now Army Captain

DETROIT, March 6—Sidney D. Waldon, formerly vice-president of the Packard Motor Car Co., has been appointed captain of the aviation section of the U. S. army, and signal officer in the reserve corps. Mr. Waldon left the automobile business some time past to actively interest himself in the aero force of the U. S. army, and to assist Howard E. Coffin in the Naval Consulting Board and in national preparedness.

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Anderson Resigns from Maxwell

DETROIT, March 6—J. H. Anderson, assistant controller of the Maxwell Motor Co., Inc., will resign on March 15, to enter into other business in New York City.

Mexico Removes Import Duties

Government Opens Way to Increased Business in U. S. A. Cars and Trucks

LAREDO, TEX., March 3—The de facto government of Mexico has just issued a decree which went into immediate effect removing the import duties on automobiles and all other motor vehicles. This action is regarded as of the greatest importance to automobile dealers, particularly those located in towns upon and adjacent to the border.

Several months ago the Carranza government increased the import duties on automobiles and accessories to what was practically a prohibitive figure and what little trade was being carried on with that country in these lines was immediately discontinued as a result of the exorbitant tax.

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Doble and Michigan Stamping Merger?

DETROIT, March 6—It is rumored that the Michigan Stamping Co. is contemplating merging with the General Engineering Co., maker of the Doble steamer. A special meeting of the stockholders of the Stamping company stockholders is called for March 16. The officials at this time deny the merger pending.

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Nielsen, Splitdorf Engineer, Resigning

NEWARK, N. J., March 6—V. A. Neilsen, engineer for the Apple Electric Co. and the Splitdorf Electrical Co., is resigning from both companies.

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Hoyt Becomes Consulting Engineer

DETROIT, March 6—Francis R. Hoyt, the Wagner-Hoyt Co. of New York City, is resigning his position and will operate as a consulting engineer.

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Receiver for Enger Motors

CINCINNATI, OHIO, March 5—L. J. Dauner has been appointed receiver for the Enger Motor Car Co. and has been authorized to temporarily continue the business. Mr. Enger's widow testified that the assets of the company were $240,000 while the undisputed liabilities were $22,000, with disputed liabilities amounting to $80,000.

The Enger Motor Car Co. last August took over the Frank J. Enger Co. to better handle the company's increased business.

In January, F. J. Enger, president of the company, shot and killed himself after a long period of illness. The company at that time had announced a twelve-cylinder car, featuring a special form of control, which allows it to be operated either on all twelve cylinders or on one of the blocks of six only.

Stutz Raises Wages 10 Per Cent

Production Raised to Ten Cars a Day—February Business Breaks All Records

INDIANAPOLIS, March 2—The Stutz Motor Car Co. to-day increased the wages of all its factory employees who are working by the hour. Ten per cent additional was the amount and over 350 men will be benefited by the increase. For the year it will mean more than $30,000 added to the present pay roll.

The company has raised its production from eight to ten cars each day and has arranged for shipment for March upon this basis. Its new building is now ready for manufacturing. For the present it will use the old axle plant, the original home of the company, for the building of the new sixteen-valve engines. It is its intention to build 300 of these motors for its Speedster models between now and July 31. Its business last month exceeded any February business in its history and from present indications its production figures, 2000 cars of the regular model and 300 sixteen-valve jobs in the speedster type, will be easily reached for 1917.

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Workmen's Compensation Law Upheld

WASHINGTON, March 6—The Supreme Court to-day upheld the New York workmen's compulsory compensation law as constitutional. It also upheld the Iowa workmen's compensation law, voluntary upon employers, and the Washington compulsory workmen's compensation or industrial insurance law.

CONDENSED STATEMENT OF CHEVPOLET MOTOR CO. FOR YEAR ENDED DEC. 31, 1916

Earnings

Net earnings from operations, after deducting cost of manufacture and expenses of selling and administration		$4,845,070.83
Dividends received		2,250,000.00
Net income for the year		$7,095,070.83
Current additions to the surplus:		
From acquirement of stock in other companies	$22,140,400.00	
Miscellaneous	234,117.12	
		22,374,517.12
Increase in surplus—current year		$29,469,587.95

BALANCE SHEET
ASSETS

FIXED:		
Real estate, plant and equipment	$5,380,006.93	
Less reserve for depreciation	279,837.95	
		$5,100,168.98
MISCELLANEOUS INVESTMENT:		
Chevrolet Motor Co. of Cal.	$250,000.00	
Chevrolet Motor Co. of Texas	350,000.00	
		600,000.00
CURRENT AND WORKING:		
Cash	$3,981,784.13	
Drafts outstanding against B/L	338,357.68	
Notes and acc. rec.	$1,694,040.36	
Less res. for dep.	52,247.98	
	1,641,792.38	
Accounts with affiliated companies	974,855.42	
Inventories	$7,109,516.11	
Less res. for dep.	254,896.51	
	6,854,619.60	
*Investment in stock of other corporations at market value	65,643,300.00	
Total current and working assets		79,434,709.21
Deferred charges		181,735.24
Contracts with affiliated companies, patents, trade marks and good will		11,958,100.26
		$97,274,713.69

LIABILITIES

CURRENT:		
Accounts payable—not due	$1,344,591.28	
Dealers' and customers' deposits	327,068.67	
Accrued items—not due	101,481.43	
Total current liabilities		$1,833,141.38

Capital Stock and Surplus

Capital stock issued	$64,250,000.00	
(Authorized $80,000,000.00)		
Less in treasury	245,200.00	
Total outstanding		$64,004,800.00
SURPLUS:		
Balance—December 31, 1915	$1,653,686.53	
Current additions	22,374,517.12	
Net profit—current year	7,095,070.83	
Balance, December 31, 1916		$31,123,274.48
Reserves—income tax and contingencies		313,497.83
Total		$97,274,713.69

*Includes 450,000 shares of the common capital stock of The General Motors Corporation.

Evinrude Tractor Engines

Rowboat Engine Manufacturer To Erect $250,000 Plant for Heavy-Duty Oil Engines

MILWAUKEE, WIS., March 3—The Evinrude Motor Co., Milwaukee, manufacturer of the Evinrude rowboat engine, is completing arrangements for the erection of a complete new motor plant, costing $250,000 or more, and will then engage also in the production of a line of oil engines for heavy-duty purposes, such as farm use, tractor and truck motive power, and other power applications. The capital stock is being increased from $350,000 to $600,000 to finance the construction of the new plant and the extension of the business. Plans are being prepared for a new machine shop, foundry and testing shop group, upon the completion of which the Evinrude business will be moved from its present plant at 271-281 Walker Street, which was erected about 5 years ago and doubled in size during the early part of 1916. It is hoped to be able to break ground by April 1, so that the new works will be ready by early fall. Christopher J. Meyer is president and general manager of the company.

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$29,469,588 Chevrolet Surplus

(*Continued from page* 489)

buildings gave the company a floorspace of 466,000 sq. ft. The company then had two more buildings in process of construction, which upon their completion meant the addition of 1000 more men.

The company has $64,250,000 capital stock issued, out of a total authorized of $80,000,000. Listed in the surplus is the balance from Dec. 31, 1915, of $1,653,686 and current additions of $22,374,517.

The balance sheet shows an increase in real estate, plant and equipment from $13,811,590, in 1915, to $17,058,269, while cash decreased from $4,192,968 to $3,981,784.

The capital stock of the company was increased during 1916 to $64,004,800, against $19,752,300 in the preceding year.

The condensed statement for the fiscal year ended Dec. 31, 1916, appears herewith.

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Pierce-Arrow Earns $13.08 on Common

BUFFALO, N. Y., March 5—The Pierce-Arrow Motor Car Co. earned $13.08 on the 250,000 shares of common stock in 1916. The net manufacturing profits were $4,076,167, after providing $352,545

for depreciation of profits. Other income amounted to $63,843, making a total income of $4,140,009. Of the total net profits for the year the proportion applicable to the operations of the predecessor company was $3,770,266 and the profit from Dec. 6, 1916, the date of incorporation of the present company, to Dec. 31, 1916, was $299,993.

The balance sheet as of Dec. 31 is:

Assets

Property account	$4,443,406
Investments in affiliated selling company	40,000
Special fund for redemption of bonds and payment of bond interest	1,287,500
Inventories	9,680,057
Notes and accounts receivable	1,450,928
Miscellaneous investments and deposits	43,322
Cash	1,463,676
Total assets	$18,408,890

Liabilities

Preferred stock	$10,000,000
Common stock	1,250,000
Capital surplus	4,081,596
First mortgage bonds called for redemption Feb. 1, 1917	1,250,000
Accounts payable	1,422,584
Customers' deposits	124,994
Bond interest accrued	37,500
Profit and loss surplus	242,215
Total liabilities	$18,408,890

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Kliesrath Talks on Ignition

WORCESTER, MASS., March 3—V. W. Kliesrath, chief engineer of the Bosch Magneto Co., gave a talk here last night on Modern Ignition Systems before the student branch of the American Society of Mechanical Engineers of Worcester Polytechnic Institute. His lecture traced the development of the ignition system from the earliest stages and was illustrated by lantern slides. The meeting was largely attended.

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Stanley Shipments 200% Larger

NEWTON, MASS., March 5—Shipments of cars by the Stanley Motor Carriage Co., for January ran 200 per cent over shipments for the corresponding month in 1916. February shipments were 300 per cent over February, 1916.

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Studebaker Profits $8,611,245

(*Continued from page* 489)

total business including the war orders there was a decrease of $400,000.

The balance sheet shows quick assets of $35,480,290, or more than three times the current liabilities. The cash position is somewhat weaker, this item amounting to $3,196,703, against $5,910,062 the previous year. Inventories, probably due to high prices, total $21,477,657, nearly 75 per cent more than in 1915.

The consolidated surplus account shows a surplus of $13,314,647, after deducting dividends of $767,550 on the preferred and $3,000,000 on the common. The surplus in 1915 was $8,470,952.36. The total current assets amounted to $35,480,290 as against $29,288,846 in 1915. Plant investment totaled $13,437.983, compared with $12,400,493 in 1915.

Singer To Double Output

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Co. Will Move Into Larger Quarters Near Its Present Plant—400 Cars Planned

NEW YORK, March 6—The Singer Motor Co., this city, will move into new and larger premises within a few months, allowing the output to be raised to about 400 cars per annum, which is approximately double the present rate of production. The new site has not been chosen finally, but it is stated that it will be on Manhattan island and probably not far from the company's present location in West End Avenue. The Singer is a high-priced chassis usually sold with custom bodywork of the highest class.

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Brown-Lipe-Chapin Not in United Motors

NEW YORK, March 7—With the decision not to exercise the option to acquire the factory and business of the Brown-Lipe-Chapin Co., by the United Motors Corp., negotiations between these two concerns have been abandoned. This means that the United Motors Corp. in no way whatever will be connected

COMPARATIVE SALES, PROFITS, DIVIDENDS AND SURPLUS OF THE STUDEBAKER CORP.—5 YEARS

Year Ended December 31	1916	1915	1914	1913	1912
Number of automobiles sold.	65,885	46,845	35,460	35,410	28,523
NET SALES, autos, vehicles and harness	$61,988,594.09	$56,539,006.23	$43,444,223.41	$41,464,949.82	$35,440,327.41
Deduct: cost of manufacture, selling and general expenses	53,032,397.46	47,045,582.77	37,870,999.25	38,834,923.69	32,243,767.19
Reserve for depreciation	435,470.05	397,991.01	361,794.01	230,356.84	193,076.34
NET EARNINGS ON SALES	8,520,726.58	9,095,432.45	5,211,430.15	2,399,669.29	3,003,483.88
Add: Other income	121,396.00	152,942.85	133,965.44	83,465.40	122,392.27
TOTAL NET EARNINGS	$8,642,122.58	$9,248,375.30	$5,345,395.59	$2,483,134.69	$3,125,876.15
Deduct: Net interest paid	.....	49,187.16	414,940.44	484,948.78	444,527.33
Premium on preferred stock	.....	84,234.13	.....	.....	.....
Discount and com. serial notes	30,877.50	47,528.73	85,791.42	93,773.02	83,675.00
NET PROFITS FOR YEAR	$8,611,245.08	$9,067,425.28	$4,844,663.73	$1,904,412.89	$2,597,673.82
7% preferred stock dividends	767,550.00	830,445.00	869,050.00	901,075.00	930,825.00
Earnings on common stock	7,843,695.08	8,236,980.28	3,975,613.73	1,003,337.89	1,666,848.82
% on amount outstanding	26.1%	29.5%	14.2%	3.6%	5.9%
Transferred to special surplus account	.....	1,317,906.63	407,023.05	406,715.62	417,008.87
Less common stock dividends	3,000,000.00	1,396,580.00	.....	.....	.....
Extraordinary items and adjustments not arising from current operations—charged off	.....	817,360.74	402,697.57	406,939.24	284,428.68
Special reserve for future contingencies	.....	1,500,000.00	.....	.....	.....
Total	$3,000,000.00	$5,031,847.37	$809,720.62	$813,654.86	$701,437.55
ADDED TO SURPLUS	4,843,695.08	3,205,132.91	3,165,893.11	189,683.03	965,411.27
Previous surplus	8,470,952.36	5,265,819.45	2,099,926.34	1,910,243.31	944,832.04
SURPLUS ACCOUNT DEC. 31	$13,314,647.44	$8,470,952.36	$5,265,819.45	$2,099,926.34	$1,910,243.31

COMPARATIVE BALANCE SHEETS—5 YEARS

Year Ended December 31	1916	1915	1914	1913	1912
ASSETS					
Cash	$3,196,703.37	$5,910,062.05	$3,539,163.58	$1,957,460.53	$865,795.46
Investments	1,142,044.96	1,570,098.69	247,654.15	246,508.72	1,075,692.30
Receivables	9,428,391.46	8,585,199.15	6,698,148.07	5,923,793.36	4,958,120.67
Inventories	21,477,657.30	13,062,041.44	13,470,564.49	16,622,228.55	15,730,840.85
Deferred charges	235,493.15	161,445.49	709,489.36	1,191,875.16	1,419,347.58
Total quick assets	35,480,290.24	29,288,846.82	24,665,019.65	25,941,866.32	24,049,796.86
% current liabilities	337%	366%	249%	184%	217%
Plant investment	13,437,983.11	12,400,493.29	12,058,040.03	11,873,297.47	10,594,807.11
Trade name, good will, etc	19,807,276.64	19,807,276.64	19,807,276.64	19,807,276.64	19,807,276.64
TOTAL	$68,725,549.99	$61,496,616.75	$56,530,336.32	$57,622,440.43	$54,451,880.61
LIABILITIES					
Notes payable	$4,000,000.00	.....	$1,870,000.00	$4,550,000.00	$1,400,000.00
Other payables	6,539,011.28	5,706,510.22	2,493,869.33	2,712,848.31	2,069,728.43
5% serial gold notes	.....	*2,305,500.00	5,550,000.00	6,800,000.00	7,600,000.00
Current liabilities	10,539,011.28	8,012,010.22	9,893,869.33	14,062,848.31	11,069,728.43
Stock sub. companies	.....	.....	28,300.00	54,341.29	28,300.00
Preferred stock	10,965,000.00	10,965,000.00	12,180,000.00	12,650,000.00	13,095,000.00
Common stock	30,000,000.00	30,000,000.00	27,931,600.00	27,931,600.00	27,931,600.00
Reserve for future contingencies	1,358,237.10	1,500,000.00	.....	.....	.....
Special surplus account	2,548,654.17	2,548,654.17	1,230,747.54	823,724.49	417,008.87
Surplus	13,314,647.44	8,470,952.36	5,265,819.45	2,099,926.34	1,910,243.31
TOTAL	$68,725,549.99	$61,496,616.75	$56,530,336.32	$57,622,440.43	$54,451,880.61

*Called for payment March 1, 1916.

with the affairs of the Brown-Lipe-Chapin Co., manufacturers of differentials, Syracuse, N. Y. While it was the impression among the automobile trade that the Brown-Lipe-Chapin Co. had actually been acquired by the United Motors Corp., as a matter of fact, the negotiations had never progressed beyond the point of an option to purchase the Brown-Lipe-Chapin Co.

—

Knickerbocker Tractor on Market

NEW YORK, March 3—The Knickerbocker Motors, Inc. has announced a new line, consisting of tractors of 3, 5 and 10-ton capacity, with trailers to complete the various units. Later motor trucks of 2½, 4 and 6-ton capacities will be produced.

The first production, for which an output of 10,000 has been scheduled for 1917, will consist of a tractor attachment for farm, road and trailer, selling at $178, which can be quickly attached to any new or used car. This attachment was designed by W. C. Guilder.

—

Pyrene Profits for 1916 Are $284,490

NEW YORK, March 5—Profits of $284,490 were made by the Pyrene Mfg. Co. in 1916. The surplus was $822,671, of which $206,327 represents the amount carried over from the year's operations after dividends of $78,163 had been paid. The company on Dec. 31, 1916, had cash on hand of $28,383.

—

McCulla is in England

TOLEDO, March 6—Wm. R. McCulla, engineer for the Willys-Overland Co. and now under service orders of the English army which he joined at the time of his trip to the war fronts for the Knox Tractor Co. has arrived in England and will shortly depart for air service.

—

Detroit Battery Increases Capital

DETROIT, March 6—The Detroit Battery Co. has increased its capital to $500,000. The company had a $10,000 capital a year ago and has made several increases since up to $60,000.

Firestone To Offer Preferred

—

$5,000,000 Balance of Authorized Issue Underwritten by Cleveland Trust Co.

AKRON, March 3—It is announced that the Firestone Tire & Rubber Co. will issue the $5,000,000 balance of its authorized preferred stock. The Cleveland Trust Co. has underwritten the issue and will make public offering in the near future.

With this stock the Firestone company will have outstanding $10,000,000 par value 6 per cent cumulative preferred stock followed by 300,000 shares of no-par common stock having a present market value of more than $44,000,000. The total net assets of the company will show more than $34,000,000 or $340 for each share of preferred stock; and the net quick assets in excess of $20,000,000 or $200 for each share of preferred stock. It is reported that earnings are at the rate of eight times the dividend requirements on the entire preferred stock.

—

Oils and Gasoline Higher

NEW YORK, March 5—Oils and gasoline and a few of the metals were higher last week. Ceylon rubber also rose, reaching 87 cents per lb. Tin went up $3.25 per 100 lb. to $54, and aluminum again reached the 58-cent mark. Gasoline has gone up to 24 cents a gallon wholesale and lard oil to $1.45 per gallon. Linseed oil rose 1 cent a gallon to 95, while cottonseed oil gained 83 cents a barrel, closing at $13.57. Lead and Para rubber dropped, the former closing at 79½ cents a pound, at ½ cent loss, and lead to $10.75 per 100 lb., a 25-cent loss.

—

Corbitt Truck Stock Offering Plans to Enlarge

NEW YORK, March 2—W. Blair & Co. is offering the unsold portion of 80,000 shares of common of the Corbitt Motor Truck Co., Henderson, N. C., for public subscription. The par value is $5. The capitalization of the company is $100,000 preferred and $900,000 common. The company will use the money to install additional equipment, sufficient to bring the production up to 1000 trucks annually.

The Corbitt company has been in business for 7 years and some time ago succeeded and took over the business of the Corbitt Automobile Co. The company now manufactures worm-drive trucks, ranging from 3-4 to 3½ ton capacities.

—

Gasoline Up in Detroit

DETROIT, March 5—Gasoline is now selling at 19½ and 20c. a gallon—record prices for this season—and motorists are wondering what the price will be when the demand increases with more moderate weather.

According to dealers, the prices will not be lower and are likely to be much higher.

—

Dividends Declared

Chandler Motor Car Co., quarterly of 2 per cent, and usual extra of 1 per cent, payable April 1, stock of record March 15.

Pierce-Arrow Motor Car Co., quarterly of 2 per cent on preferred, payable April 2 to stock of record March 15.

White Motor Co., quarterly of $1 per share, payable March 31 to stock of record March 15.

Kelly-Springfield Tire Co., quarterly of $1.50 per share on 6 per cent preferred, payable April 2, to stock of record March 17.

Hayes Mfg. Co., quarterly 3 per cent, payable March 31 to stock of record March 25. Automatic Crankshaft Co., quarterly of 1¾ per cent on both preferred and common, payable March 31 to stock of record March 25.

—

Initial Dividend for Stromberg

CHICAGO, March 1—The Stromberg Carburetor Co. of America has declared an initial quarterly dividend of 75 cents per share on its 50,000 shares of no par value stock, payable April 2 to stock of record March 15.

—

United Truck Pays Initial Dividend

GRAND RAPIDS, MICH., March 5—The United Truck & Equipment Co., Inc., has declared an initial quarterly dividend of 1¾ per cent on its preferred stock, payable March 1. This company controls the United Motor Co., builders of United trucks, at Grand Rapids. The company is earning the dividend on the preferred stock by a large margin.

—

Wayne Tractor Stock to Public

WAYNE, MICH., March 5—The Wayne Tractor Co., Wayne, Mich., capitalized for $300,000 divided into 3000 shares with

Daily Market Reports for the Past Week

Material	Tues.	Wed.	Thurs.	Fri.	Sat.	Mon.	Week's Changes
Aluminum, lb.	.57½	.57½	.58	.58	.58	.58	+ .00½
Antimony, lb.	.34	.34	.32½	.31	.31	.32	— .02
Bessemer Steel, ton	70.00	70.00	70.00	70.00	70.00	70.00	...
Copper, Elec., lb.	.37	.37	.37	.37	.37	.37	...
Copper, Lake, lb.	.37	.37	.37	.37	.37	.37	...
Cottonseed Oil, bbl.	12.74	12.86	12.93	13.12	13.55	13.57	+ .83
Fish Oil, Menhaden, Brown, gal.	.74	.74	.74	.74	.74	.74	...
Gasoline, Auto, bbl.	.23	.24	.24	.24	.24	.24	+ .01
Lard Oil, prime, gal.	1.36	1.36	1.45	1.45	1.45	1.45	+ .09
Lead, 100 lb.	11.00	10.75	10.75	10.75	10.00	10.75	— .25
Linseed Oil, gal.	.94	.94	.94	.94	.94	.95	+ .01
Open-Hearth Steel, ton	70.00	70.00	70.00	70.00	70.00	70.00	...
Petroleum, bbl., Kans., crude	1.70	1.70	1.70	1.70	1.70	1.70	...
Petroleum, bbl., Pa., crude	3.05	3 05	3.05	3.05	3.05	3.05	...
Rapeseed Oil, refined	1.05	1.05	1.05	1.05	1.05	1.05	...
Rubber, Fine Up-River, Para, lb.	.80	.80	.79½	.79½	.79½	.79½	— .00½
Rubber, Ceylon, First Latex, lb.	.84	.84	.87	.88½	.88½	.87	+ .03
Sulphuric Acid, 60 Baume, gal.	1.00	1.00	1 00	1.00	1.00	1.00	...
Tin, 100 lb.	50.75	50.75	51.75	54.50	54.50	54.00	+3.25
Tire Scrap, lb.	.06½	.06½	.06½	.06½	.06½	.06½	...

a par value of $100 each, is offering some of its capital to the public. The company owns its 22 acre plant at Wayne and states that it will have a tractor on exhibition in this city some time this week. It has no bonds, funded indebtedness or preferred stock, and all common is fully paid and non-assessable.

—

Miller Rubber Selling 5000 Shares of Common

AKRON, March 3—It is reported that the Miller Rubber Co. is selling 5000 shares of new common stock from its treasury to present holders of common pro rata at par. Three Akron rubber companies are engaged simultaneously in financing. They are offering in all $14,870,000 par of new stock.

—

Fisher Body Earns $639,000

DETROIT, March 3—The Fisher Body Corp., from the date of incorporation, August 21, 1916, to November 30, 1916, shows in a recent report a surplus available for common stock for those three months, of $639,000, equal to $3.20 per share on 200,000 shares of common stock.

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Ravenna Rubber Increases Capital

CLEVELAND, OHIO, March 1—The Ravenna Rubber Co., this city, has increased its capital from $100,000 to $250,000.

—

Westlake Machine Reduces Capital

TOLEDO, March 1—The Westlake Machine Co., this city, has reduced its capital from $1,500,000 to $250,000.

Motor Issues Show Strength

—

Financial Statements Have Stabilizing Effect on Market—Moderate Gains Made

NEW YORK, March 5—The automobile and accessory issues last week were steady with moderate increases in a number of the low-priced securities. Several important financial statements were announced this week which had a direct bearing on the stability of the market. The Chevrolet statement was favorable and was responsible for a 5 point rise. The annual report of the Studebaker Corp. came opportunely and checked liquidation that has been proceeding in the common stock for the past week. The U. S. Rubber statement shows big earnings and sales and the clearing up of all the company's debts.

Tire issues were active. Kelly-Springfield common rose 1 point on account of the quarterly dividend, Miller Rubber common rose 8 points. Goodrich common rose ½ point and Fisk common 1 point. On the other hand, several declines occurred in the tire issues.

The Chevrolet Motor Co. has applied for the listing of its $64,004,800 capital stock on the New York exchange.

—

Peerless 1916 Net $2,100,000?

CLEVELAND, March 7—The Peerless Truck & Motor Corp. is reported to have earned $2,100,000 net during 1916, which, after deducting substantial depreciation charges, is equivalent to 21 per cent on the common stock.

—

Standard Parts Earning 20%

CLEVELAND, March 7—Earnings of the Standard Parts Corp. are running at the rate of $2,000,000 a year, or equal to 20 per cent on the common stock.

—

Offers Stock to Public

CLEVELAND, March 6—The Ackerman Wheel Co., this city, is offering common stock to the public at par value of $100 per share. The company states the proceeds will be used to furnish necessary equipment, purchasing of supplies, working capital and increase its production. It is manufacturing a resilient wheel to be used with solid or cushioned tires or automatic tires, and claims that it is now working on orders for five different tractor planes for coast defense. The plant of the Ackerman Wheel has a present production capacity of 100 wheels per day. Officers of the company are: A. H. Ackerman, president; M. M. Everhard, vice-president; H. P. Arndt, treasurer; D. D. Walker, secretary.

Its board of engineers is composed of A. H. Ackerman, M. E.; R. R. Abbott, engineer and metallurgist, Peerless Motor Car Co.; E. C. Arndt, chief metallurgist, Western Spring & Axle Co.; A. W. Ferrin, M. E., formerly tool designer and engineer for the Willys-Overland Co.; Prof. John F. Keller, Purdue University; R. W. Makutchan, vice-president and factory manager of the Makutchan Roller Bearing Co., Chicago.

Automobile Securities Quotations on the New York and Detroit Exchanges

	Bid	Asked	Net Ch'ge
*Ajax Rubber Co.	68	69	—1½
*J. I. Case T. M. Co. pfd.	83	85	+1
Chalmers Motor Co. com.	25	30	+5
Chalmers Motor Co. pfd.	..	..	..
*Chandler Motor Car Co.	98	99	+ ½
Chevrolet Motor Co.	113	117	+5
Fisher Body Corp. com.	35	40	..
Fisher Body Corp. pfd.	91	94	+1
Fisk Rubber Co. com.	75	85	..
Fisk Rubber Co. 1st pfd.	101	5	..
Fisk Rubber Co. 2d pfd.	70	100	..
Firestone Tire & Rubber Co. com.	143½	146½	—1
Firestone Tire & Rubber Co. pfd.	107	109	..
*General Motors Co. com.	114	114½	+ ⅜
*General Motors Co. pfd.	89	89½	+1
*B. F. Goodrich Co. com.	56	56½	+ ½
*B. F. Goodrich Co. pfd.	108	110	..
Goodyear Tire & Rubber Co. com.	240	250	—32
Goodyear Tire & Rubber Co. pfd.	107	109	+ ½
Grant Motor Car Corp.	5	7	..
Hupp Motor Car Corp. com.	3½	4½	..
Hupp Motor Car Corp. pfd.	85	90	—3
International Motor Co. com.	13	15	—2
International Motor Co. 1st pfd.	..	70	..
International Motor Co. 2d pfd.	..	30	..
*Kelly-Springfield Tire Co. com.	55	57	+1
*Kelly-Springfield Tire Co. 1st pfd.	91	95	..
*Lee Rubber & Tire Corp.	19	20	—2½
*Maxwell Motor Co., Inc., com.	56½	57	+1
*Maxwell Motor Co., Inc., 1st pfd.	70	71	+1⅞
*Maxwell Motor Co., Inc., 2d pfd.	35	35½	+ ¼
Miller Rubber Co. com.	261	265	+8
Miller Rubber Co., pfd.	104½	105½	†—½
Packard Motor Car Co. com.	156	..	—1
Packard Motor Car Co. pfd.	..	102	..
Paige-Detroit Motor Car Co.	38	39	— ¼
Peerless Truck & Motor Corp.	15	18	..
Portage Rubber Co. com.	161¾	164½	—3¼
Portage Rubber Co. pfd.	..	..	..
Regal Motor Car Co. pfd.	25	30	—2
Reo Motor Car Co.	36	36¾	..
*Saxon Motor Car Corp.	54⅝	55	+1⅛
Springfield Body Corp. com.	70	80	..
Springfield Body Corp. pfd.	110	120	..
*Stewart-Warner Speed. Corp.	82½	83½	—1⅛
*Studebaker Corp. com.	100⅛	100¼	— ⅝
*Studebaker Corp. pfd.	103	108	+1
Swinehart Tire & Rubber Co.	79	84	—1
United Motors Corp.	39	39¾	—2¼
*U. S. Rubber Co. com.	56½	56¾	+3
*U. S. Rubber Co. pfd.	107¼	109	+ ¼
*White Motor Co.	49	50	..
*Willys-Overland Co. com.	34⅝	35¼	+ ⅝
*Willys-Overland Co. pfd.	97	98½	..

*At close March 5, 1917. Listed New York Stock Exchange.
†Extra dividend.

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

ACTIVE STOCKS

	Bid	Asked	Net Ch'ge
Auto Body Co.	..	34	..
Chalmers Motor Co. com.	..	..	..
Chalmers Motor Co. pfd.	..	..	..
Continental Motor Co. com.	8	8⅛	+ ½
Continental Motor Co. pfd.	98	99	..
Ford Motor Co. of Canada	247½	..	+2½
General Motors Co. com.	..	..	..
General Motors Co. pfd.	..	..	..
Maxwell Motor Co. com.	53	56	— ½
Maxwell Motor Co. 1st pfd.	..	..	..
Maxwell Motor Co. 2d pfd.	..	..	..
Packard Motor Car Co. com.	158	164	..
Packard Motor Car Co. pfd.	..	101	..
Paige-Detroit Motor Car Co.	..	38¼	..
W. K. Prudden Co.	..	50¼	..
Reo Motor Car Co.	36¼	36½	— ¼
Studebaker Corp. com.	98	101	—1
Studebaker Corp. pfd.	..	..	..
C. M. Hall Lamp Co.	..	31	..

INACTIVE STOCKS

Atlas Drop Forge Co.	38	..	..
Kelsey Wheel Co.	..	..	..
Regal Motor Car Co. pfd.	25	30	..

250-Mile Race for Chicago

Opening Meet June 9—Non-Professionals Race in Morning

CHICAGO, March 6—Plans for the first Chicago races were announced yesterday by the Speedway Park Assn. These have been set for June 9 and will be for 250 miles with a purse of $20,000. The event will not be classed as a championship event as the American Automobile Assn. has decided to allot each track only one of the championships and the Chicago number is to be reserved until later in the year. This race will be limited to 300 cu. in. displacement but as a curtain raiser it is planned to stage a 100-mile race for non-professionals in the morning, limited to cars of 200 cu. in.

American Speedways Assn. Meets

INDIANAPOLIS, March 6—The addition of several foreign cars to the American racing contingent for the 1917 season was partially assured by the announcement made to-day at the meeting of the American Speedways Assn. that definite arrangements for the importation of Sunbeam and two Fiat racers were nearing completion.

The scoring and timing of all 1917 races will be done by the Speedway association staff. There will probably be two electric timers.

22 Makes of Cars at Boston Salon

BOSTON, March 4—Boston's Automobile Salon opened this morning and like New York's is essentially a style show. It is held in the grand ballroom of the Copley-Plaza Hotel and is staged by the Boston Automobile Dealers' Assn. which also puts on the exhibition in Mechanics and Horticultural Halls. Chester I. Campbell manages both.

All told, there are twenty-two different makes of cars on view as follows:

Brewster	McFarlan
Chandler	Ohio Electric
Daniels	White
Disbrow	Owen-Magnetic
Fiat	Pierce-Arrow
Franklin	Phianna
HAL	Rauch & Lang
Jeffery	Electric
Liberty	Rolls-Royce
Locomobile	Simplex-Crane
Marmon	Stearns-Knight
Mercer	

111 Truck Chassis Displayed at Brooklyn Show

BROOKLYN, March 7—There are thirty-eight makes of trucks on exhibition in the commercial vehicle section of the Brooklyn automobile show, not including nine makes of Ford adapters. The number of chassis exhibited is 111 besides nineteen Ford adapters. Some features of the show are the new 1½-ton Dodge truck in addition to the ½-ton vehicle recently announced, the new radiator on the Garford with a cast case and finned tube core, and a Packard chassis on a revolving stand which is operated either electrically or by turning the steering wheel. Attendance at the show last night was 4500.

Accessory Show for Chicago

CHICAGO, March 6—Rothschild & Co., one of Chicago's largest department stores, is planning a large accessory show to occupy an entire floor of the store for the week beginning March 17. Accessories will be shown and demonstrated in use and low prices will be a feature.

Twin City Speedway Sold

MINNEAPOLIS, MINN., March 5—The Twin City Speedway was to-day sold by the Sheriff for $250,000 to the Minneapolis Trust Co., holder of $350,000 bonds. The speedway went into the receivers' hands July, 1916, said to be on account of labor and material claims of nearly $100,000 unpaid. The stockholders brought a liability suit on March 9.

Witters Represents Grossman in West

NEW YORK, March 5—J. M. Witters has joined the Emil Grossman Mfg. Corp. He will represent it in the sale of Red Head spark plugs and Ever Good motor necessities among the manufacturers in the Middle West.

Sheepshead Bay Speedway in Financial Difficulties

NEW YORK, March 6—The Sheepshead Bay Speedway Corp., which built the 2-mile board track speedway is in financial difficulties and has called a meeting of its stockholders for March 21 to discuss plans for reorganization. The trouble is connected with a mortgage of $2,040,000 on the real estate. A foreclosure of this is under way. There is over $50,000 interest due on the mortgage. The trouble goes back to the building of the speedway when construction work greatly exceeded all estimates. There was not sufficient capital at any time. The 2 years of racing were not financial successes.

Motor Sales Corp. Will Handle Harroun

DETROIT, March 5—The Motor Sales Corp. has been formed and incorporated to handle the sales and service of the Harroun car in Detroit, Wayne County, and nineteen adjoining counties in southeastern Michigan. The new organization is headed by Hugh S. Quinn and J. M. Wetmore, who have been successful distributers in this territory. Mr. Quinn is president and Mr. Wetmore secretary and treasurer of the new company.

Cooper's Stutz Wins Ascot Race

Average 68 M.P.H. in 100-Mile Race—Pullen Second in Mercer

LOS ANGELES, March 5—Earl Cooper in a Stutz won yesterday's George Washington Sweepstakes race at Ascot Speedway, covering the 100 miles in 1 hr. 27 min. and 46 sec., an average of 68.05 m.p.h., a record for the course. Pullen was second in a Mercer, his time being 1 hr. 28 min. 18 sec., and Toft in the Omar was third, his time being 1 hr. 30 min. and 38 sec. Pullen's average was 67.96 m.p.h. and Toft's 66.19 m.p.h. Cooper won $3,000.

The Frontenac driven by Joe Boyer led the field at the beginning but was soon displaced by Cooper, going out at 27 miles with a broken wristpin. The field originally numbered twelve starters but one driver was excused. Cooper set the pace and took things easy up to the twenty-eighth lap. Pullen blew a tire while driving high on the curve and, while stopping at the pits to change, Toft went into second place. By the end of forty laps the Mercer was second again.

In the fifty-ninth lap Cooper changed three tires, Pullen going to the lead but losing it again two laps later when he had to stop for tires. At this point Cooper again took the lead and kept it to the finish.

The final Ascot race of the winter season will be run March 25.

Four American Makers at Lyons Fair

NEW YORK, March 5—To date four American automobile and accessory manufacturers have decided to exhibit at the fair in Lyons, France, starting on March 17 and lasting 2 weeks. These are the U. S. Rubber Export Co., Ltd., the Jewell Belting Co., Hartford, Conn., the Goodyear Tyre & Rubber Co. of Great Britain, and the Wayne Oil Tank & Pump Co., Ft. Wayne, Ind.

Hood To Distribute Detroit Lock

CHICAGO, March 3—Wallace C. Hood Service Bureau has been put in charge of the entire distribution of the Detroit Cartridge lock, manufactured by the Detroit Motor Lock Co.

R. C. Durant with Leavitt Co.

SAN FRANCISCO, CAL., March 5—R. Clifford Durant, son of W. C. Durant, president of the General Motors Co., has allied himself with the J. W. Leavitt Co. as one of the vice-presidents. The Leavitt Co. recently purchased the Chevrolet business in southern California from Major H. D. Ryus.

The Automobile

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Ideals and Common Sense

HAVE you read Keeping Men at Their Jobs in this issue?

When you finished did you realize that another term for Firestone "ideals" is "common sense"?

It was not a dreamer's imagination that prompted the factory superintendent to remain on a level with the workers. It was not sentiment that brought him a realization of the injustice in the foremen's right to discharge. Nor was it a weak impressibility that made him install the permanent day shift. Common sense was the prime factor in these acts.

It was "good business" in its highest meaning. He merely grasped the vital fact that men are even more important than machinery—and that the way the man operates the machine depends chiefly upon the way the man eats, sleeps, reads and plays.

Workers as just as efficient as they are healthy, happy and content. Men cannot work with disordered stomachs. They cannot think with clouded brains. They cannot labor profitably for 8 hr. when they suffer lack of sleep. Work without recreation is fatal to progress.

In Detroit and in Akron, where populations have more than doubled in recent years, are houses where men sleep in shifts just as they work in shifts, where one individual occupies the same bed that has just been vacated by another, where 192 cu. ft. of air and no window for ventilation form the common rule. Such men cannot perform steady and careful work. They cannot be expected to be precise, content and profitable employees. They must be assisted to live in healthier surroundings.

War and Color

UNDOUBTEDLY the color situation in this country would have been much better if it had not been for the war. It was freely predicted in 1914, just as the war started, that the colors of American cars would assume a little more variety and less of the dull black.

It may be that in time our own manufacturers will be able to develop materials that will take the place of those which used to come from abroad, but so far there has been nothing to show that this will take place for some time. One of the worst difficulties in the matter of color is that of obtaining exactly the same shade in two consecutive lots from the same source.

It has been stated that a certain ingredient which enters into the composition of red was so scarce that there was only 500 lb. afforded by the market of the entire country. This was bid for by various companies of the East with the result that the price rose far above the actual value of the product. In fact, the situation is now such that no one is sure that he will be able to get any more color like that on hand, and the result is that very often two lots which are supposed to be alike, do not agree by several shades.

It is also a fact that with the baking system applied to cars, anything but black is very dangerous to handle. The colors will run off and unless the heats have been very accurate, every car will have a shade of its own and sometimes two or three shades. The entire question of painting the car is one which requires a great amount of study and presents one of the most perplexing problems the factory has to deal with. Under the circumstances, the departures from the safe and sane in the color line are going to be few during the present condition of the pigment market.

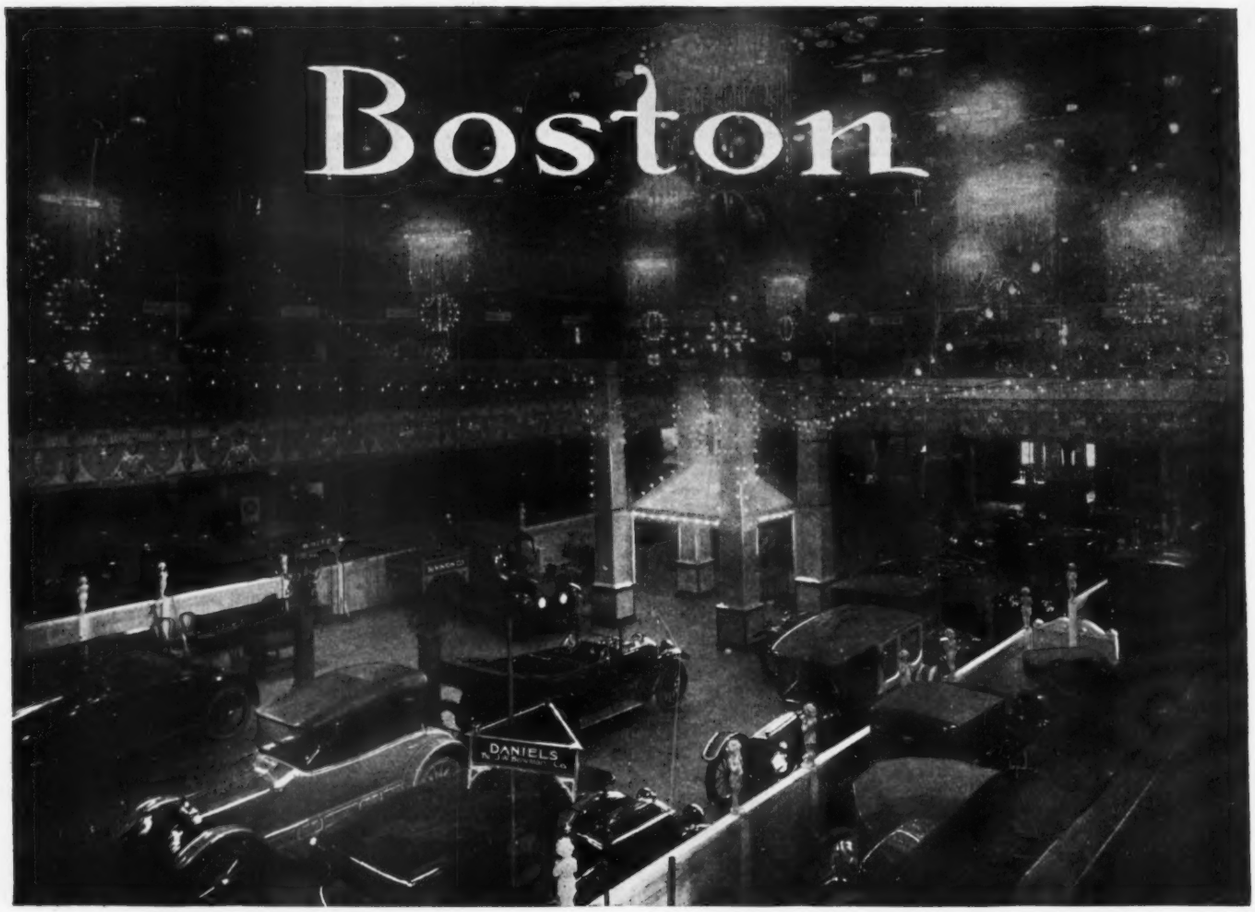
Balanced Crankshafts

RECENTLY the balanced crankshaft having been accepted by engineers as a good thing seems to have taken a great hold of the imagination of many other ranks of the industry.

A few cold facts may not be out of place.

A balanced crankshaft will make a good engine run smoother at high speeds, but a properly designed engine will run at *high enough* speeds with no additional benefit from an abnormal shaft, and no system of balancing can increase power except at quite high speeds.

If an engine has an essentially weak shaft the whipping of that shaft at high speeds places stresses on the bearings and causes power to be wasted in friction. By balancing the shaft we may stop the whipping and so raise the power, but this is only a side issue; the real value of a balanced shaft is the greater smoothness of the engine at the highest speeds the owner is likely to use.



Looking across the main floor of Mechanics Hall as it appeared at the opening of Boston's fifteenth annual automobile show

New England's Largest Show Opens

Reflects Prosperity of Territory—519 Cars and Trucks Shown—One New Car

TWO factors are rendering the automobile business in New England more prosperous to-day than it has ever been before. The occasion of the 1917 Boston show finds New England in the greatest state of manufacturing activity that it has ever known and finds the New Englanders richer than they have ever been before; finds them, in fact, among the richest people in the world.

The presence of new and quickly-earned wealth naturally booms the passenger car business, but, together with this, congested railroads and enhanced production are booming truck sales enormously.

The truck serves two purposes in New England. In the city areas there are more people to whom goods have to be delivered and the people, by virtue of the money they have been making, purchase more extensively. This means that the amount of retail delivery is enormous.

On the other hand the factories situated off the main lines of the railroads have suffered excessively from freight car shortage and general congestion so that in many instances they have been transporting their product to a convenient point on the main line, using motor trucks for this purpose.

New England agriculture, always prosperous, is now at the zenith of earning power by reason of the price of potatoes, and in Maine especially a large number of small fortunes have been made solely on potatoes. This has stimulated the purchase of trucks as part of farm equipment as well as encouraging passenger car trade.

That this wave of prosperity is not going to break with the wind-up of the munition orders is now certain. While the munition contracts raised New England industry from a condition of quiescence to one of intense activity, the domestic demand is certainly going to keep the factories running at least full time and a little more, if not at the day and night pressure at which they have been running.

With the density of the population, the nearness of cities to each other and the generally excellent roads, it would be difficult to find anywhere where the truck could be used as advantageously. Of course the delivery from factories to some distant point on a railroad is a temporary condition, but there will certainly continue to be much road haulage between such cities as Hartford and Springfield. The conditions approximate much more closely to those of a European country than anywhere else in America. The large department stores in London have for years been delivering as far away as 150

miles by motor truck and found it paid. We may easily see the same sort of thing happening from Boston.

Two Car Types in Special Demand

In the passenger car business there appears to be a demand for two distinct types of car. New England is a natural touring ground, and this fact apparently is appreciated just as much by the New Englander as by the thousands who come from other parts to visit New England in the summer months. For his touring the New England motorist wants a five, six or seven-passenger car, but for his daily work such a machine is unnecessarily big. New England cities generally have but little waste space in their streets so for the ordinary daily round a roadster or a close-coupled four-passenger job is much more suitable than a large car. In a great number of cases a man will own both the large touring car and a small machine.

There has been strong demand in the past year for the custom style car painted in some special color. Many dealers have been catering to this kind of business, have, in fact, been pushing it and the colors asked for on these special jobs have covered the rainbow and a great deal more besides. On the whole, however, the more brilliant hues have been less in demand than the "aristocratic" special maroons, special dark greens and so on. It is the rich, solid, made-to-last-a-century look that the New Englander seeks.

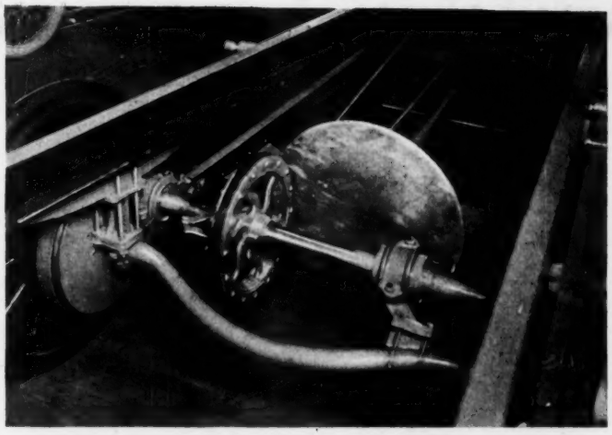
Boston's fifteenth annual exhibition is, as usual, a style show, largely an exhibition of beautiful bodies. It is the biggest show New England has ever seen. For the first time it has been necessary to requisition another building to hold it. Heretofore it has always been crowded into Mechanics Hall; but this year there was such a big overflow that the old Horticultural Hall, where Boston's first shows were held was again put to use.

519 Cars and Trucks

As usual the Boston show is the most complete show. It has some ninety different brands of passenger cars, fifty different makes of trucks, and 170 accessory exhibits. A count shows that there are 519 trucks and cars on the floors of the two buildings.

Most of the cars and trucks already are familiar to the show-going public though about a dozen makes are new to Boston. One car not previously shown is on view.

This is the Napoleon which is made by the Napoleon Automobile Mfg. Co., Napoleon, Ohio. It is a well-finished, attractive looking car with a five-passenger body, and a wheelbase of 112 in. The engine is a 3½ by 5-in. Lycoming four with Dyneto starting and lighting system. Other essential elements are a disk clutch, three-speed gearset, Weston-Mott axle and cantilever rear springs. The tires are 31 by 4-in.



Rear of new Metz delivery chassis exhibited at Boston, showing friction drive mechanism. Note dead axle

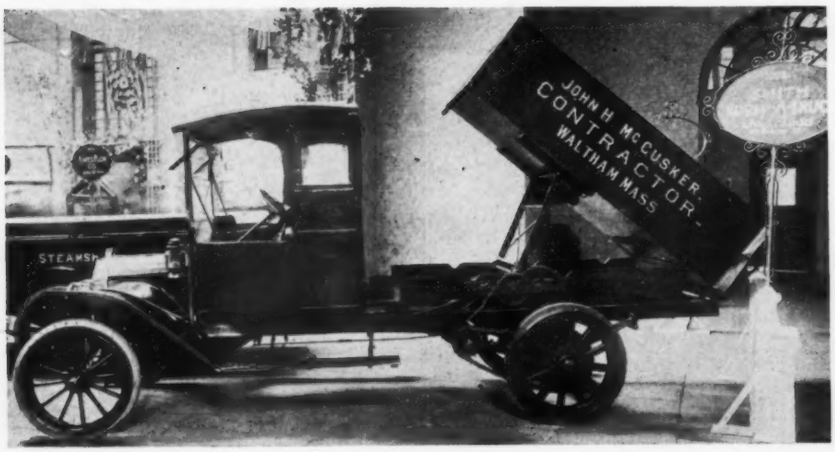
The sober black and white effect that last year transformed the big building into a real show place, this year has given way to a riot of color. Judge of it by the high-sounding titles which have been given the two halls. One is the "Hall of Jewels"; the other, "Gardens from other Lands."

Neither is entirely descriptive of the decorations. In Grand Hall the white figures that stood in the center last year are atop white fences, which make of the center a place apart; and in the center a pagoda rises toward the roof-trees. Great clusters of electrics, every color in the rainbow, are reflected from clusters of crystals as big.

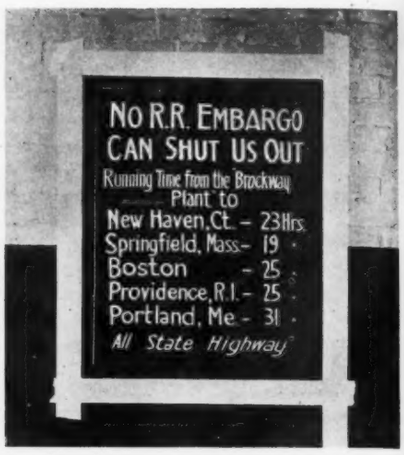
Exhibition Hall is a series of gardens; there is an exhibit to a garden, white fenced and separated from the next by masses of foliage and flowers. Overhead some of the glory of Grand Hall has been borrowed and strings upon strings of colored tungstens are reflected from the kind of crystals that hang from the chandelier in an old-fashioned "best room."

The public is flocking to the show. On opening night, esti-

View in a part of the accessory section of the Boston show, giving an idea of the wide aisles and neat decorations



Smith Form-A-Truck fitted with ingenious dump body exhibited at the show. A Ford chassis is used in this truck



Sign in the Brockway truck exhibit which requires no explanation

mates of the attendance vary between 45,000 and 50,000; at any rate, half an hour after the doors were thrown open at 2 p. m. it was all but impossible to push through the jam. At Horticultural Hall there was a fair sprinkling of visitors, but the concensus of opinion seems to be that putting this part of the show so far away from the main show—the show to which Boston has been accustomed to go for so many years—was not as satisfactory as might be desired. Horticultural Hall is located at a point several blocks away from Mechanics Hall.

Timken-Detroit Axle Co. Bonus System

AS reported in THE AUTOMOBILE last week, the Timken-Detroit Axle Co. has introduced in its plants a dual bonus plan based upon regular attendance and length of service. The plan has been devised to eliminate the huge loss which results where thousands of men are employed and many are frequently late, and to act as an incentive toward regular attendance, greater volume of product, and as a reward for continuity in the employ of the company the plan includes the following:

Bonus for Regular Attendance

For the first 30 days of full attendance, without being late and without stopping before regular quitting time, the company will pay a bonus of 3 per cent upon the straight time earnings; for the second 30 days, 4 per cent, third successive 30 days, 5 per cent; and 5 per cent thereafter for continued perfect attendance. One infraction of the attendance rule, except where absence is authorized, will forfeit the bonus for the preceding period of the month and the employee must start over again at the lowest per cent.

Bonus for Length of Service

Workers who labor steadily for 6 continuous months receive 1½ per cent of the earnings for the first quarter of the year, 2 per cent for 1 year of continuous service, 4 per cent for 2 years of continuous service, 6 per cent for 3 years of continuous service, 8 per cent for 4 years of continuous service, and 10 per cent for 5 years and thereafter. The service bonus will be paid on April 25, July 25, Oct. 25 and Dec. 25, on the earnings of the preceding quarter. The Regular Attendance bonus will be paid upon the tenth of each month for the preceding calendar month.

Considered as Retainer

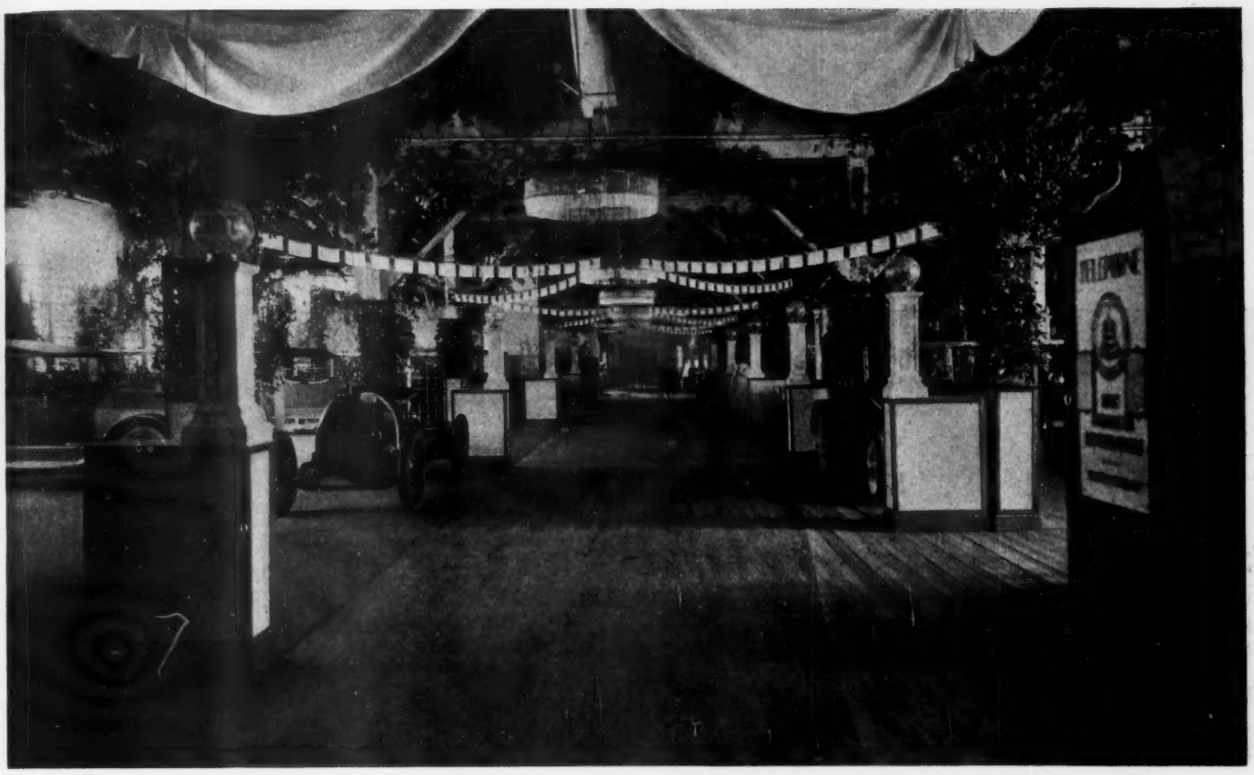
If any employee of the company is temporarily laid off because of slack work, but is not taken off the payroll, he will continue on the service bonus plan, and will receive the bonus based on the equivalent of his average earnings covering the period he is laid off. This bonus is considered as a retainer and will not be paid unless the employee returns to work immediately upon notice of the company, when it will be included with his first attendance bonus after his return.

The payment of Dec. 25 will include the earnings through Dec. 25 and the last payment in December will be carried to the next quarter.

Service Bonus—Table Showing Grading

Year Employed	Month Employed											
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1917 Start 6 Months 1½%	July 1917	July 1917	Oct. 1917	Oct. 1917	Oct. 1917	Jan. 1918	Jan. 1918	Jan. 1918	April 1918	April 1918	April 1918	July 1918
1916 Start 1st Year 2%	Jan. 1917	Jan. 1917	April 1917	April 1917	April 1917	July 1917	July 1917	July 1917	Oct. 1917	Oct. 1917	Oct. 1917	Jan. 1918
1915 Start 2d Year 4%	Jan. 1917	Jan. 1917	April 1917	April 1917	April 1917	July 1917	July 1917	July 1917	Oct. 1917	Oct. 1917	Oct. 1917	Jan. 1918
1914 Start 3 l Year 6%	Jan. 1917	Jan. 1917	April 1917	April 1917	April 1917	July 1917	July 1917	July 1917	Oct. 1917	Oct. 1917	Oct. 1917	Jan. 1918
1913 Start 4th Year 8%	Jan. 1917	Jan. 1917	April 1917	April 1917	April 1917	July 1917	July 1917	July 1917	Oct. 1917	Oct. 1917	Oct. 1917	Jan. 1918
1912 Start 5t Year 10%	Jan. 1917	Jan. 1917	April 1917	April 1917	April 1917	July 1917	July 1917	July 1917	Oct. 1917	Oct. 1917	Oct. 1917	Jan. 1918

EXAMPLE:—Employee started August, 1916, will start 1½% bonus with January, 1917.
Employee started March, 1917, will start 1½% bonus October, 1917.
Employee started April, 1912, will start 10% bonus with April, 1917.

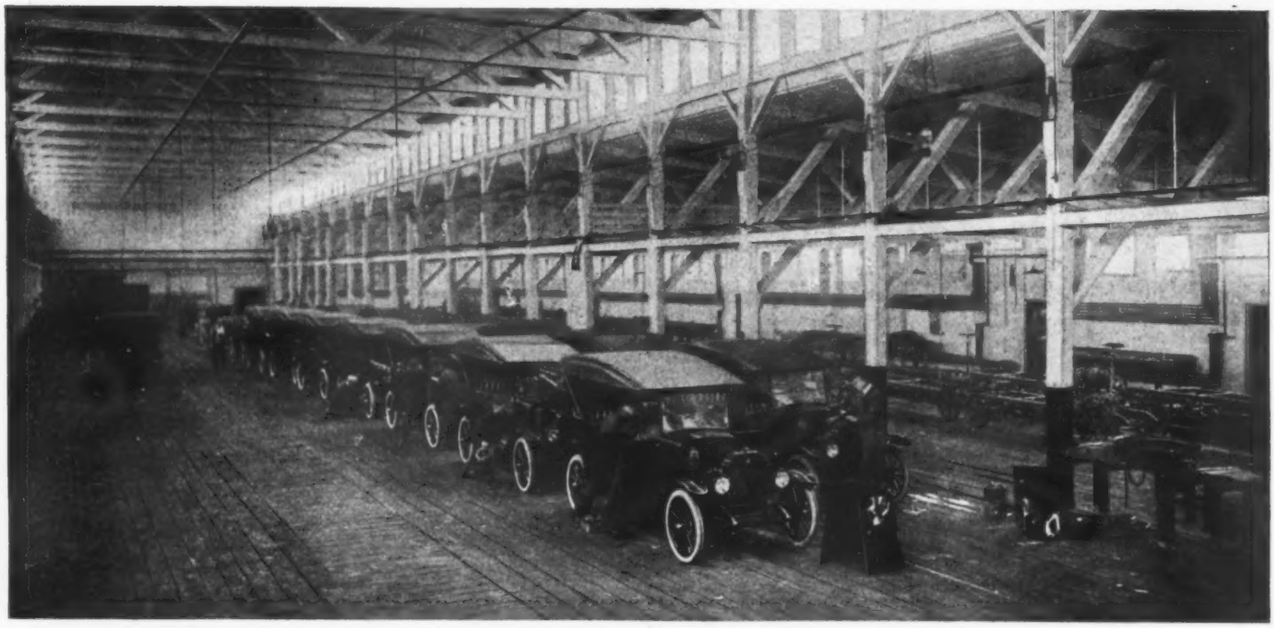


View down one of the aisles in Exhibition Hall, giving an excellent idea of the attractive decorations, the wide aisles and the ample exhibit space available. This hall is arranged as a series of gardens, there being one exhibit to each garden with white fences around it and separated from the other exhibits by masses of foliage and flowers

Grand Hall is decorated to accord with the title Hall of Jewels. In the center stands a pagoda and great clusters of electrics of all colors of the rainbow are reflected from crystals and prisms like those which decorated the chandeliers of Colonial days

Emerson Ships Five Cars a Day

Production Is Well Under Way—Factory Has Good Stock of Parts—Co. Plans to Begin Making Its Own Engines in July



View in Emerson factory March 1 showing sixteen cars being completed for shipment. These cars were not lined up for this photograph but were going through the normal course of production. They are being fitted with floor boards, speedometers and other detail equipment. To the right is the long assembly floor, 180 ft. in length

KINGSTON, N. Y., March 1—To-day we visited the factory of the Emerson Motor Co. here, for the purpose of finding out at first hand exactly what this company is doing in the production of automobiles. We brought our own photographer and took the photographs which are reproduced herewith. Nobody connected with the Emerson organization had any intimation of our visit until we arrived. The photographs taken were all made according to our directions. There was not a single chassis or part moved into any position in order to make a good photograph. Everything was photographed exactly as it was. There was no cleaning up of the floor, no rearranging of parts, no grouping of chassis on the assembly floor, no posing of workmen, everything was taken exactly as we found it. We wanted it so in order that our readers might get a true picture of what is being done. Our artists have not done any retouching on a single photograph.

106 Cars Shipped Up to March 1

We found the Emerson company assembling cars and shipping them on a schedule of approximately five a day. Sixteen complete Emerson cars were loaded on the freight cars today; yesterday nine were shipped, on Tuesday seven were shipped and on Monday seven were shipped. We were advised that 106 had been shipped to date.

Outside of the factory we counted seven regulation automobile freight cars waiting to be loaded.

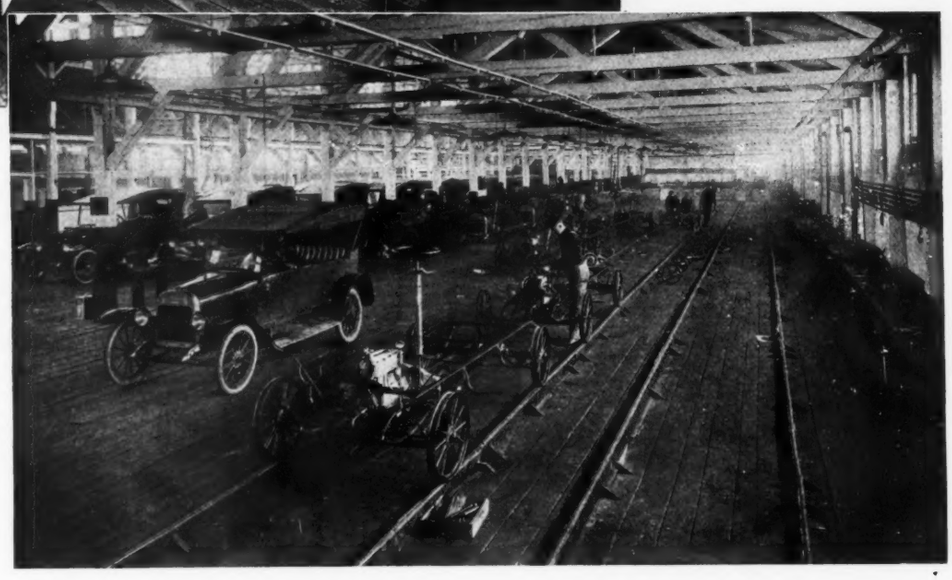
Through the factory we were most concerned at seeing how production was moving along through the different departments. We found thirty chassis in different stages of construction, as follows: At the start of assembly were eight frames being fitted with axles, springs, etc.; on the progressive assembly floor with its two tracks for assembly were nine chassis in various stages of completion; in the chassis paint department were nine chassis being painted and fitted with tires; and four other chassis were completed, waiting to have bodies fitted on them.

Freight Congestion Delays Bodies

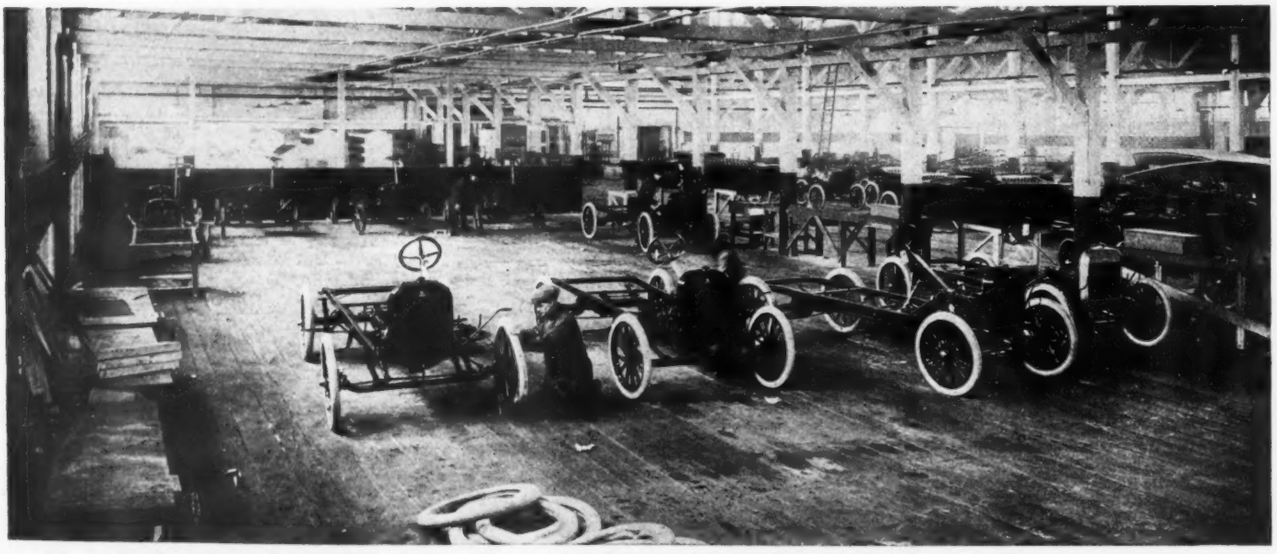
We looked for bodies and found nineteen cars fitted with bodies and practically complete ready for shipment. There were four bodies mounted on wheeled trucks ready to be mounted on chassis; eight others were waiting to be taken out of the final varnish room; and thirteen others were waiting to be put in the varnish department. The company advised that it is getting its bodies from the Middle West and is having much difficulty with railroad shipments.

Looking around for other indications of stock to go into the chassis, we found the following: Rear axles, 230; front axles, approximately 150; frames, 44; springs, 600; mufflers, 20; radiators, 26; propeller shafts, 40; starting and lighting equipment, 20. In addition there were small groups of other components in different places, in the raw stock room, finished stock room, and in different parts of the assembly floor. There were eleven motors on the assembly floor which had just been received and were being uncrated. We were advised that motors were arriving at the rate of six a day, which is only at half the rate the company needs them. In fact, everywhere

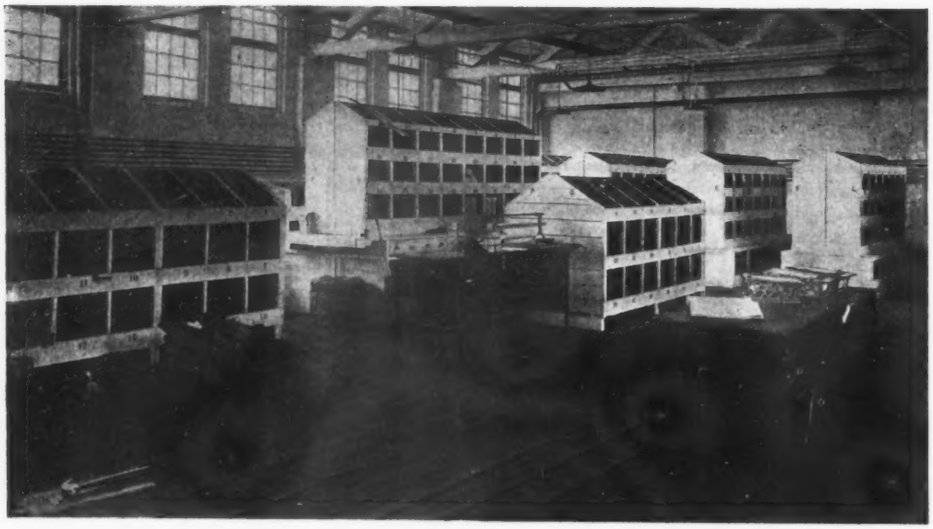
Rear end of Emerson assembly floor photographed March 1. This shows seven chassis in the early stages of assembly. This space is at the end of the progressive assembly floor. Here the frames are started and the addition of springs and axles made. In the foreground the motor has been dropped into position. This done the car is moved onto the progressive assembly floor



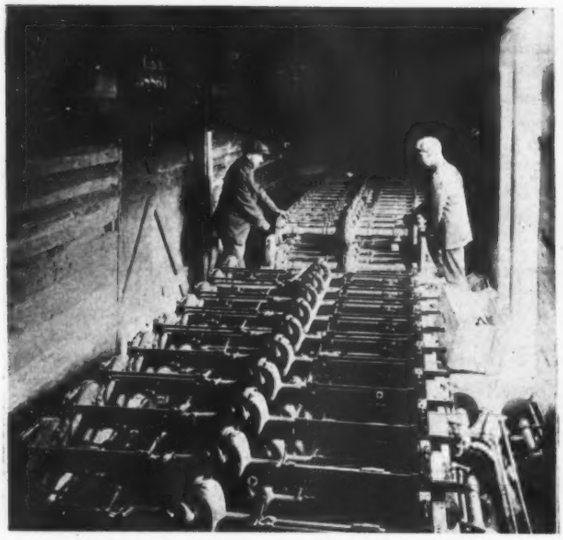
General view of assembly floor in Emerson factory March 1 showing nine cars moving along in process of assembly. These cars were not arranged in this order for photographing purposes but just as they were caught without the factory knowing of our visiting the plant. There are two assembly tracks each 180 ft. in length and there is room for two additional tracks to the left of these. Along the right are work benches the entire 180 ft. These were generally stocked with chassis parts



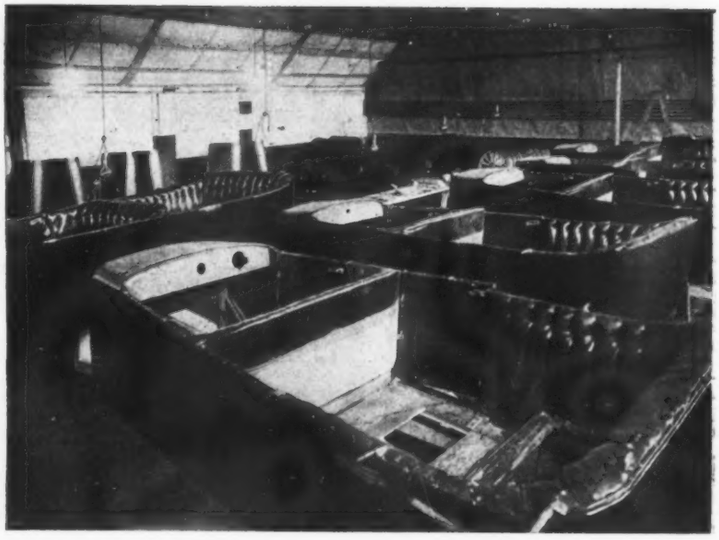
Chassis painting department in Emerson factory March 1. This shows nine chassis completed, being painted and fitted with tires, preparatory to being moved into the department where the body is added



The stock room for small finished parts photographed in Emerson factory March 1. This room has over 600 bins, many of which were partially filled with materials. In one corner not shown in the photograph were twenty-six radiators ready for putting on the chassis

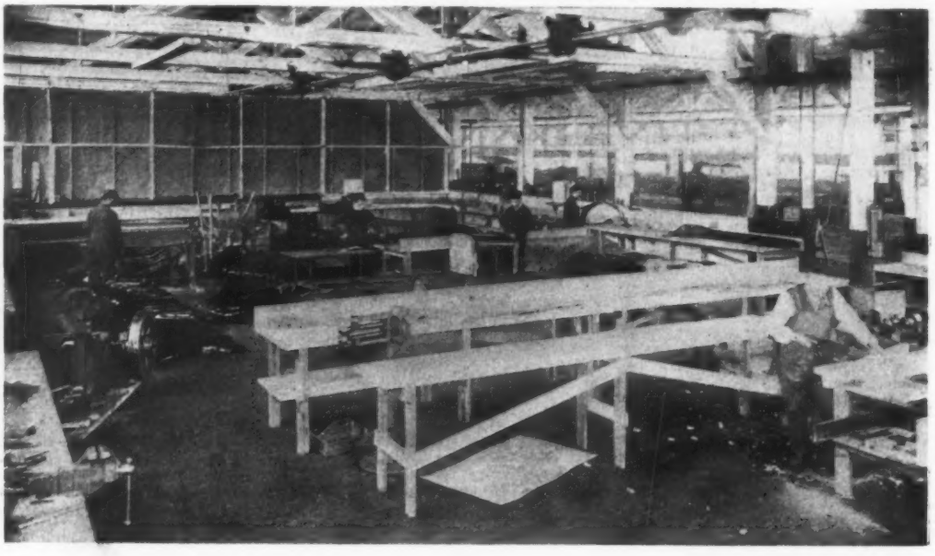


Photograph taken at Emerson factory March 1 showing interior of freight car, containing over 150 rear axles, being unloaded. Beside it was another car which arrived previously with springs. Over 500 springs were counted in the stockroom and many others waiting to be unloaded

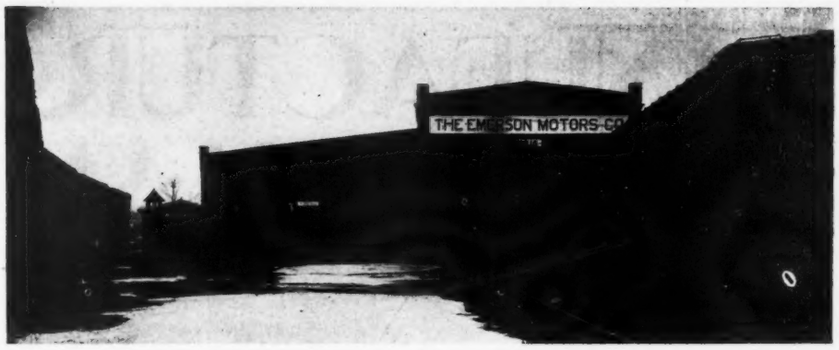


Body painting department in Emerson factory photographed March 1. Nine bodies were drying the final finishing coat. One hundred and seventy-five wheels were being dried and 150 others ready for spraying. There were also other parts, such as fenders, hoods, etc.

Sheet metal department in Emerson factory, photographed March 1. In this department, 70 by 90 ft., work has been going on for some time. Some of the fenders are being manufactured here, as are the hoods. There was in the department approximately 65,000 lb. of sheet metal ready for use. The machine equipment included a rolling machine for fenders, one sheet metal cutter, one punch ready to be installed, a beading machine, and one or two minor machines.



throughout the factory we found activity in practically all departments along the percentage that you would expect in a factory producing and shipping five cars a day on an average. Thirteen workmen were engaged on chassis assembly; twenty were working on finished cars for shipment; four were in the chassis paint department; three were working in the paint and varnish; there were five in the sheet metal department; eight were in the machine shop; and we did not have an opportunity of counting the numbers engaged in unloading, working in the raw stock department, in the finished stock department, and in the primary chassis assembly. There were others engaged in loading cars, several in the engineering department, and in the other miscellaneous departments.



One end of the Emerson factory at Kingston, showing freight cars on the sidings to receive finished automobiles

The factory is roughly T-shaped with the vertical part 317 by 152 ft. and the cross part 280 by 70 ft. The cross part is the machine shop, which is modern in every respect. It has been fitted with a cement floor and a new addition measuring 90 by 70 ft. added by the Emerson company. Machinery worth $28,000 has been bought and paid for and $32,000 worth of additional machinery ordered, which will be installed in 60 days.

The company contemplates manufacturing a great many of its own engines and has in process of manufacture $35,000 worth of tools and jigs for motor manufacture. Already $12,500 has been paid on this item. The company has at present arranged for the manufacture of 1500 engines. It expects to begin the manufacture of its own engines in July.

At present the machine shop is used for machining all parts going into the assembly of the car.

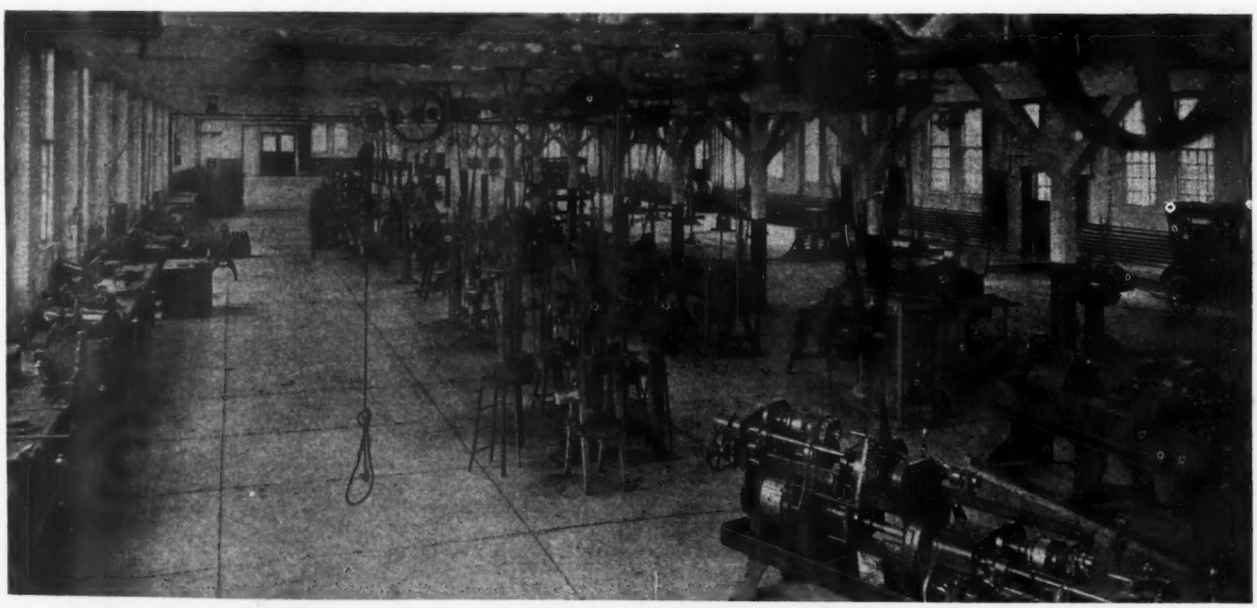
The vertical part of the T in the factory layout is used for general assembly work. It roughly divides itself into three parallel parts from end to end. At the right is the chassis assembly with room for four parallel assembly tracks. In the center the bodies are fitted and the final assembly of all car parts accomplished. Along the left is a chain of four departments: sheet metal work, final paint and varnish, chassis painting and fitting, and finished stock.

The sheet metal department, 72 by 40 ft., is at present fitted with a new fender rolling machine, cutting machine, beading machine, etc. At present the hoods are being manufactured here and some of the fenders. It is planned to manufacture many of the body parts also.

Real estate and buildings cost $136,000, all of which have been paid for, excepting a mortgage of $33,000, which will be paid off at $5,000 per year. The property is free of taxes for 5 years. Approximately $150,000 has been invested in materials which have been in the process of manufacture for car components. Machinery equipment has taken $28,000 and $32,000 more is going into it. For tools and jigs for motor manufacture $35,000 is being expended, of which $12,500 has already been paid out. Financial statements show $160,000 cash in the bank.

The company has contracted for 10,000 sets of parts for car manufacture and of these deliveries have been specified on 5000.

At present the company reports having between forty and fifty dealers who are contracting for cars and placing deposits in the regular selling way. The company states that it expects to manufacture 150 cars in March and to exceed 300 in April.



General view of machine shop in Emerson factory photographed March 1. It measures 280 by 70 ft. and has been concreted in the last few months. Part of this shop, a section 94 by 70 ft., was built last fall at a cost of $9,000. Approximately $18,000 has been expended to date in this shop. All of the machining on parts needed in the assembly of Emerson cars is done here. The shop has capacity to take up the manufacture of motors; which is expected to start about July 1

MANUFACTURERS' MERCHANDISING

Manufacturer to Distributor, Dealer, Buyer

Fifth Article of The Automobile's New Department

Packard's Lincoln Highway Sales-Race

Making 2500 Cars Go Where 1200 Went Before

2 Months' Intensive Selling

"IT couldn't be done—but he did it!" came in concert from a thousand Packard voices at the start of the selling sweepstakes on Washington's Birthday. Then President Alvin Macauley threw a switch which started 800 salesmen all over the United States and in far away Honolulu at a pace 100 per cent higher than they ever traveled before.

The 2-months' race was off. It involved the salesmen who were racing to sell the 2500 cars in 2 months; it involved every last man in the factory to extend the co-operation of his particular work, for in 2 months twice the normal quota of cars was to be sold.

A Test for Dealers' Organizations

Every Packard dealers' organization is on test. This contest is a direct measure of his personal efficiency and the efficiency of the organization under him. It is a test of the efficiency of the whole Packard selling plan. To realize what it means, think of determining to do in the next 2 months exactly twice the amount of work you have done in the 2 months just gone by. It means double effort, an earlier start each day and a later finish. It means the abolishment of Sundays and holidays while the race is on. This is a difficult task, but —this Packard contest involves not only keeping one man at this double-work pace, but an entire organization involving several thousand units.

Setting a Standard

The Packard contest is to find out what the highest efficiency of each unit in the entire organization is. Once this is determined it sets a mark that can be used in judging future results. It is setting a fast pace to take 2500 cars and sell them in 2 months at a time of the year when 1200 is the normal amount disposed of.

No man has to be more of a student of human nature or psychology than the sales manager who holds the rudder in a factory producing automobiles in quantities. The nature of the men who are selling the product must be as an open book to him if he intends to keep the cars moving. It means that enthusiasm must be maintained, and nothing maintains this so much as competition.

Boosting the Quota

A continual state of competition without ever releasing the tension is probably too great a strain, but the occasional spurt where every man must show what he has got in him is invaluable. This is the basic lesson at the bottom of the sales contest. The score is kept on boards which illustrate the Lincoln Highway. This is divided into 100 equal parts, each representing 1 per cent of quota. The quotas are based on past performances. No man wants to see his organization in any but first place on that Lincoln Highway scoreboard, and if he has the proper spirit he is going to work hard to put it there. If he hasn't got the proper spirit this contest will enable the Packard company to find it out, and a weak spot known is half corrected.

On the scoreboard the race starts at San Francisco. When the contestant reaches New York he has sold 100 per cent of quota. If he exceeds 100 per cent, he takes a theoretical yacht and goes South along the coast of the United States. The map is illustrated on page 511. One of these scoreboards hangs in every distributor's window all over the country. The results are communicated to the dealers by telegraph, the distributors being divided into four classes so that the competition is as fair as it is possible to make it.

Plan Keeps Interest High

In staging these contests a point which should be borne in mind is that interest must be kept up during the entire running of the race. It often is so arranged that in a dealers' contest the interest is far livelier at

the start and at the finish than it is during the intermediate period. One of the meritorious parts of this idea is that the interest is kept up during the entire race by the perpetual scoreboard. Each contestant knows where he stands at every part of the race, and when one is dropping toward the end it is certain that he is going to put forth every effort to make the Twin Sixes go a little faster.

At the factory the contest is being watched with as great an interest as it is among the dealers themselves. On Washington's Birthday patriotic exercises were held in which a great many of the factory people were present, and it was at this time that the race was started.

The race is off, the Packard men are on test. Whatever the result will be the idea is one which any manufacturer can use to great advantage. It is a test of the entire organization, and 2 months from now, when the last horn blows and the last of the 2500 cars has crossed the bridge between the sales department and the purchaser, the Packard company will know what is the best that its organization can produce. It will know its weak spots and its strong ones, and when an organization knows these it is ready to progress.

Have You Tested Your Sales Efficiency?

Mr. Manufacturer, have you ever tested the real strength of the selling organization you have worked up for perhaps several years? Do you know how near 100 per cent efficient it is? Are the boys selling all the cars they can, or are they selling quota, and then resting on their laurels and only "taking orders" for the rest of the season?

You don't know unless you have found out what their efficiency really is. It takes a test of some kind to find out, and this is one of the main purposes of the Packard contest.

Manufacturers' merchandising is passing into a new stage of development. A few years ago every organization was striving to obtain *more* dealers. Then quantity was the main consideration. To-day the manufacturer must get *better* dealers. Quality is the higher consideration because selling is becoming more intensive.

Two Ways to Success

Carry this lesson away! Know what your organization is capable of and then do two things:

First—Keep your organization working close to the high mark of capability by keeping each unit up to what you know it can do.

Second—Improve your organization so that its maximum is higher year by year. It can be done by getting better units and by improving those units which you now hold.

Map used as scoreboard in recording the progress of Packard sales organizations in Lincoln Highway sales-race

Timken Axles

Floating and Semi-Floating Rear Axle Designs and Two Front Axle Types Developed to Meet all Requirements of Car and Light Truck Manufacturers

TWO types of rear axle and two types of front axle are marketed by the Timken-Detroit Axle Co. as stock products to take care of the needs of manufacturers of assembled cars. These axles are the development of 14 years in this particular line and embody a long list of improved details.

The two rear axles are distinct designs, one being a floating type and the other a fixed-hub or what is commonly known as a semi-floating. The fundamental difference between the two types is of course familiar to engineers, in that the housing carries all the bending stresses in the floating axle while with the fixed hub type the shafts carry both bending stresses and driving torque.

In the front axles the chief difference in the design is in the knuckle. One type has plain bearings above the knuckle, while the other has Timken roller bearings. The latter axle is used in some of the larger passenger cars, such as the Cadillac, and has also found favor among some of the makers of light commercial vehicles.

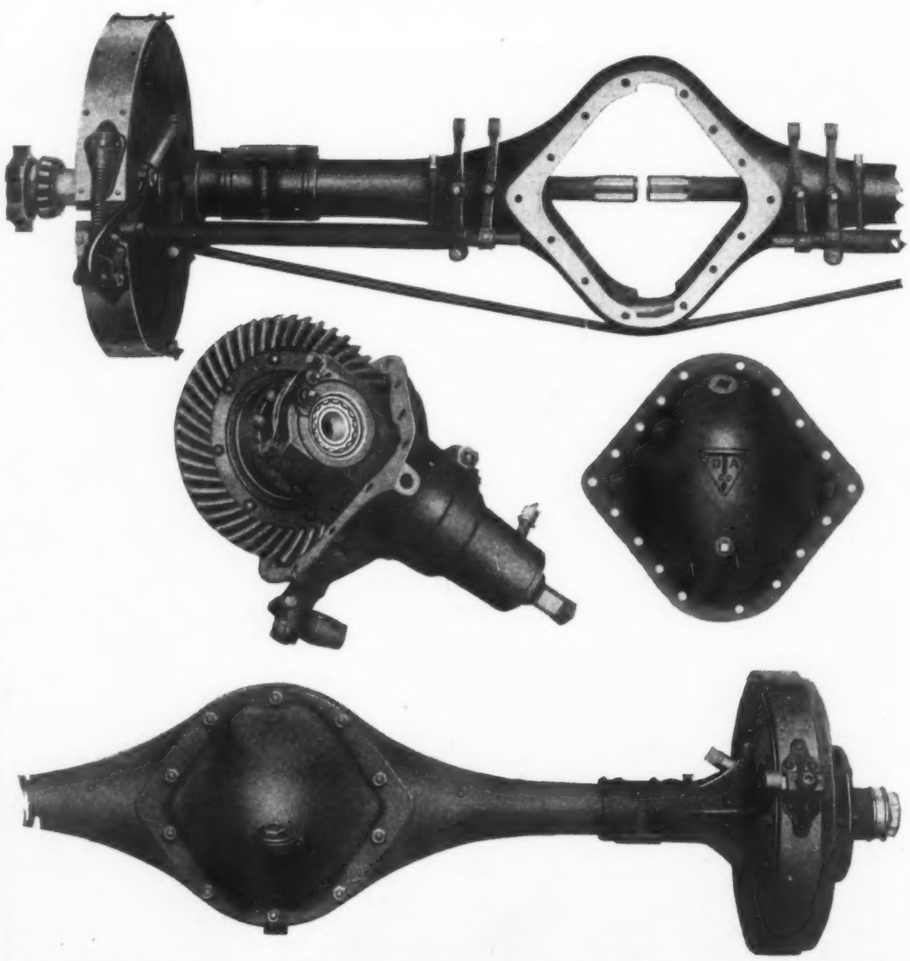
These four axles, two rear and two front, give the manufacturers of assembled or semi-assembled cars a range of choice which enables them to suit any desired conditions. These are straight stock products of the Timken company and can be suited to the brake linkage and spring mountings of the individual car manufacturer. It is of course a matter of economy to adhere as closely as possible to the stock specifications which are illustrated herewith.

Timken Floating Axle

Probably about the best known of the Timken products is the floating axle with spiral bevel drive. This axle is provided with a continuous pressed steel housing with ground steel sleeves to carry the exterior bearings, welded into place. These sleeves are shown in the drawings and extend well in beyond the spring seats and not only act as a seating for the bearing but as a re-inforcement of the tube. In addition to this sleeve there is another tube which surrounds the shaft and acts as an oil retainer.

The entire driving assembly is held in a carrier which contains the gears, bearings and differential. This gives a complete unit rear axle power transmission plant and results in maximum rigidity and alignment maintenance. The component units of the power transmission plant are of alloy steel, the drive shafts being chrome nickel alloy with the driving dogs forged integrally. These shafts are machine finished throughout their entire length, first being milled and then ground on the engaging faces, to give a solid unit from pinion to rear wheel. At the differential end the drive shafts are splined and at the rear wheel end they are fitted with integral driving dogs. Heavy pressed steel is used for the outer flange of the hub with spoke sockets and hubs designed to take 1¾-in. spokes as standard or 2-in. spokes as a maximum.

In the fittings for brakes and springs, liberal allowances have been made for dimensions which would take care of the car weight that the axle is intended to carry. The axle illustrated is designed for cars not exceeding 3500 lb. in weight exclusive of passengers. This has brakes 17 in. in diameter with



Upper—Timken-Detroit rear axle with unit carrier removed in one piece. Note large differential housing cover plate
Lower—Timken-Detroit fixed-hub or semi-floating axle

pressed steel brake drums. Both brake levers are carried to the center and are fitted with the compression springs illustated and also standpipes with oilers; the anti-rattle features fitted to the brake members are apparent in the illustration. The maximum spring center distance is 39½ in.

In manufacture the gears are drop forged, machined, hardened in matrices and ground by patented methods. The spring seats are designed to swivel on wide, ground bearings, divided laterally and provided with large grease cups. Ground torque rod pins in hardened and ground bushings are used at the connecting points of these members and there are also adjustments for end play at these points. Another point at which grinding is used is in the juncture of the pressed steel cover plate. This is ground to fit the differential housing and between the cover and the housing there is a molded rubber gasket.

This tight connection of the cover plate is part of the general scheme to secure tightness in all the connections. The axle is designed to be absolutely dust-tight. The most exposed point in an axle is the forward pinion shaft bearing because it is here that the exposed part of the drive enters the axle housing. As will be noted from the section there is a washer at this point which is intended to protect the pinion bearing. The connection to the drive shaft is through a standard S. A. E. 1½-in. taper fitting on the 3500-lb. axle. Timken adjustable roller bearings are used throughout. They are shown at both ends of the pinion shaft, supporting the differential and in the inner and outer wheel bearings.

Timken Fixed-Hub Axle

Timken fixed-hub or semi-floating axles of the present series include six different standard models of the same characteristics but of different capacities and dimensions. The wide range of choice will enable the manufacturer to use the standard product in practically every case and get better prices due to quantity production.

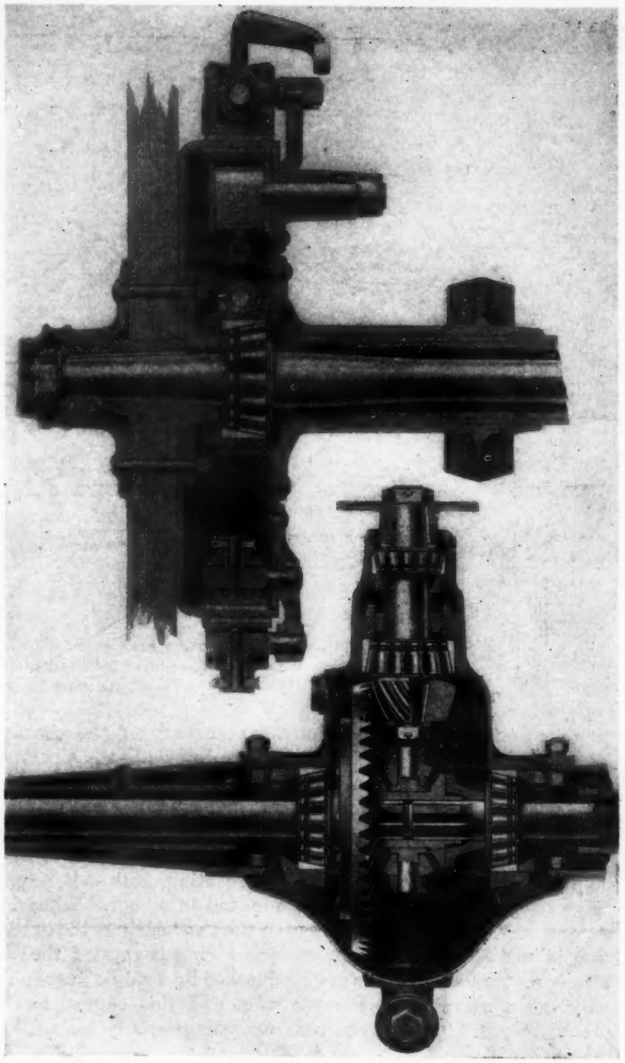
This line of axles is particularly adapted to the Hotchkiss type of drive, taking torque and propulsion through the springs. There is a modification furnished also for cars not using Hotchkiss drive, with fittings and swiveling spring seats.

A continuous pressed steel housing is used for these axles with a reinforcement at the outer end in the form of a cast spider which carries the spring seats integral. This axle, in common with the floating type described, carries a steel tube within the housing to prevent oil from being carried from the differential to the brakes. The steel tube is brought up close to the differential bearing and prevents oil from being thrown on the axle shaft and eventually working its way to the external end. Over the rear end of the axle housing there is a pressed steel cover.

In the manufacture of the gears and in the employment of the unit carrier system to make up the rear axle power transmission plant the principle is the same as that described for the floating type of axle. The carrier which takes in all the transmission parts is bolted to the front face of the housing and can be removed for inspection purposes. One of the places in which weight has been saved in this axle is in the use of the universal joint flange as a backing for the forward pinion shaft bearing.

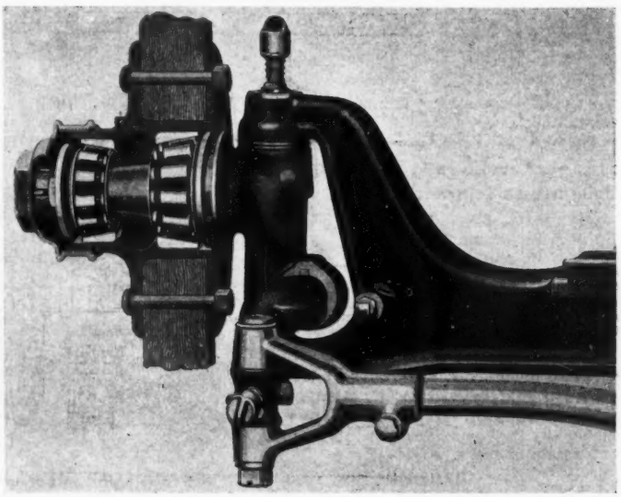
Chrome nickel steel is used for the driving shafts. They are machined the entire length, hardened and ground. One of the points which illustrates the care used in obtaining uniform strength throughout the length of these shafts is shown in the enlarging of the diameter at the inner and outer ends. This enlargement takes care of the reduced section due to spline cutting at the inner end, and at the outer end it takes care of the extra stresses near the wheels. There are no sharp shoulders at any part of the shaft.

The wheel hubs are held in place by long, straight keys on standard taper fittings, and, as is customary with these fit-

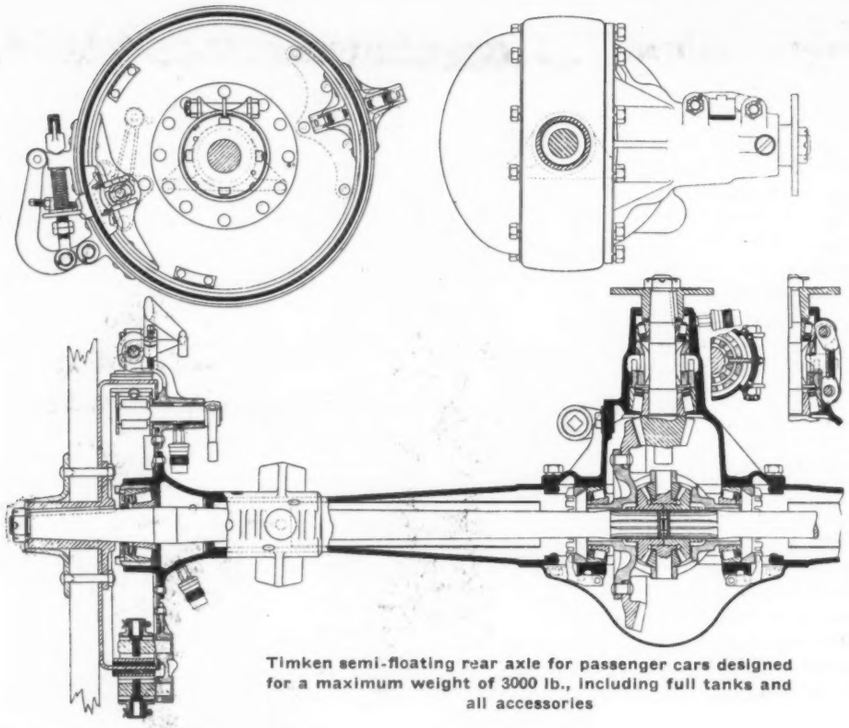


Upper—Wheel connection and mounting of the Timken-Detroit fixed-hub or semi-floating rear axle

Lower—Illustrating the unit carrier on the Timken-Detroit rear axle, in which the pinion shaft and universal assembly are carried as a unit transmission plant



Wheel mounting and steering knuckle connection on Timken-Detroit front axle



Timken semi-floating rear axle for passenger cars designed for a maximum weight of 3000 lb., including full tanks and all accessories

tings, are fastened by lock nuts on the ends of the shafts. The hub bodies are forgings and the outer flanges pressed steel. The brake drums are 14 in. diameter and have a 2 in. face width. They are pressed steel and equipped with anti-rattling features.

In adjusting these axles, both the pinion gears and bearings can be easily taken up. By rotating both adjusting rings together, the pinion may be moved in or out. When it is necessary to take up play between the two bearings the outer ring is held stationary, while the inner ring is rotated the proper amount. Both rings are then locked by a single finger, which is illustrated in the drawing, and this cannot be placed in position until the bearings are properly locked.

Timken Standard Gear Ratios

On the floating axle the standard ratios are as follows:

GEAR RATIOS AVAILABLE—ALL 4½ PITCH

Ratio	No. Teeth in Pinion	No. Teeth in Gear
2-13/21 to 1.....	21	55
3-1/18 to 1.....	18	55
3-7/16 to 1.....	16	55
3-2/3 to 1.....	15	55
3-13/14 to 1.....	14	55

On the semi-floating axle the standard gear ratio and other specifications are as follows:

Gear ratio, 4 5/11 to 1.
Teeth in pinion, 11.
Teeth in gear, 49.
Pitch of gears, 4¾.
Track, 56 in.
Hub bolt holes, 6 for 12 spokes.
Spokes, 1⅜ in.
Brakes, 14x2 in.
Brake lever eyes, S. A. E. standard.
Pinion shaft end, S. A. E. standard.
Universal joint companion flange furnished by customer for assembly on axle before shipment.

Optional

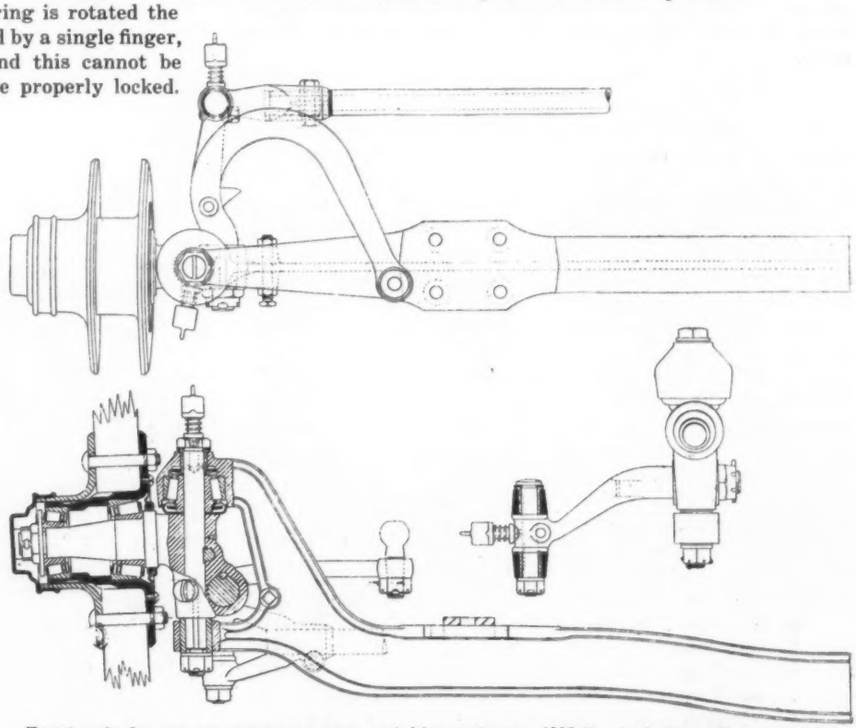
Gear ratio, 4 1/12 to 1; teeth in pinion, 12; teeth in gear, 49.
Width of spokes, 1½ in. or 1⅝ in.
Drums can be drilled for 6 spoke bolt holes on a 10½-in. diameter circle only, for ⅜ in. bolts.

Two Front Axles

Two types of Timken front axle are manufactured. The larger type illustrated is for the heavier passenger cars and may also be used on light commercial vehicles. The centers are drop-forgings of I-beam section, heat-treated. All the bearing surfaces, including the axle spindles, steering knuckle bolts, bushings and bearings, are ground to size and are held within limits of 0.001 in. or less. Timken bearings are provided on the wheel spindles and in the steering knuckle heads and both are adjustable. There is also an adjustment to limit the throw of the steering knuckles. Pressed steel hubs are used with a removable outer flange.

Another important feature is the use of dustproof devices at all moving points on the steering knuckles, steering cross rod yokes and wheel bearings. The cross rod yoks bearings are located under the yoke and have hardened and ground steel bushings to provide for wear. The steering arms are oval in section and tapered, and the steering ball is finished in three sizes, 1, 1⅛ and 1¼ in. The ball is hardened and ground to size and fits into the steering arm with a taper.

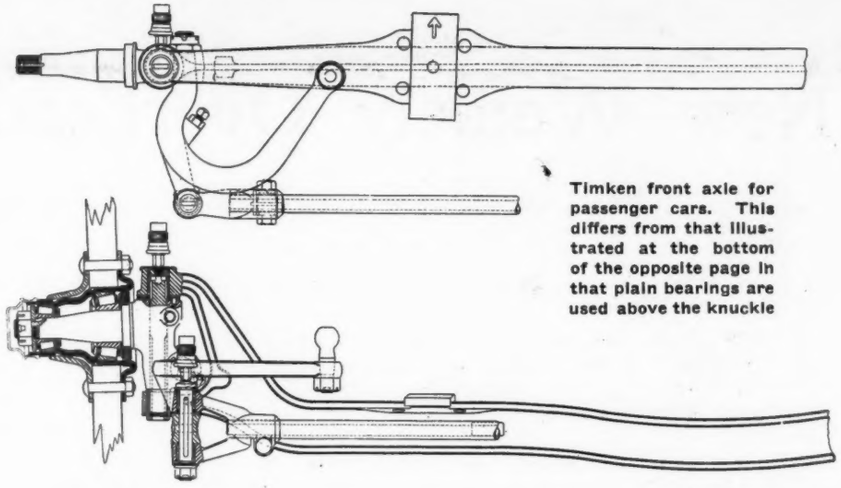
The spring seat is tilted and designed to carry the axle in the proper position to produce a caster effect in steering. The steering knuckle pin is locked to the steering knuckle by a key carrying bearing at the extreme end of the yoke; this also has an adjustment provided to take up wear.



Front axle for use on passenger cars weighing not over 4000 lb., including all accessories and full tanks but without passengers. It is also suitable for commercial cars with solid tires, where the total loaded weight on the front tires does not exceed 1700 lb. Note Timken roller bearings

The spring seats are provided for springs 1¾, 2 and 2¼ in. wide, and spring centers can be furnished from 27 in. minimum to 33½ in. maximum. Two types of centers are provided for the springs, as illustrated.

For lighter passenger cars, a smaller front axle with a plain bearing at the top of the knuckle is manufactured. The axle of the type illustrated has a capacity for a maximum car weight, including everything but the passengers, of 3200 lb. In manufacturing practice, this is parallel to the larger axle, having a drop-forged center, chrome-nickel steel knuckles and steering arms. Roller bearings are used on the wheel spindles and the hubs are pressed steel. In other ways, this axle is a smaller edition of the larger type. It has the tilting spring seats, ground bearing surfaces and grease cups and oil grooves provided on all bearing surfaces. The specifications of this smaller axle are:



Timken front axle for passenger cars. This differs from that illustrated at the bottom of the opposite page in that plain bearings are used above the knuckle

STANDARD SPECIFICATIONS

Track, 56 in.
Hub bolt holes, 6 for 12 spokes.
Spokes, 1⅜ in.
Spring centers, 26½ in., set at an angle of 2 deg. 24 min.
Width of springs, 2¼ in.
Spring clip holes, 19/32 in.
Center to center clip holes, 2⅞ in.
Steering ball, 1⅛ in.
Drop from center of spindle to top of spring pad, 3 9/16 in.
Drop in center of axle forging, ¾ in.

Optional Specifications

Another center forging with the following specifications can be furnished if desired. These specifications must be taken in their entirety and no combinations of the standard and optional specifications can be given.

Spring centers, 28½ in., with spring seats parallel.
Width of springs, 2 in.
Center to center clip holes, 2⅝ in.
Drop in axle center, none.
Other specifications same as above.

Guatemala Wants Cars But No Trucks

GUATEMALA CITY, GUATEMALA, March 2—Automobiles are increasingly desired in this country, in spite of the fact that roads are poor and gasoline is 60 cents per gallon. Motor trucks are not used here, however.

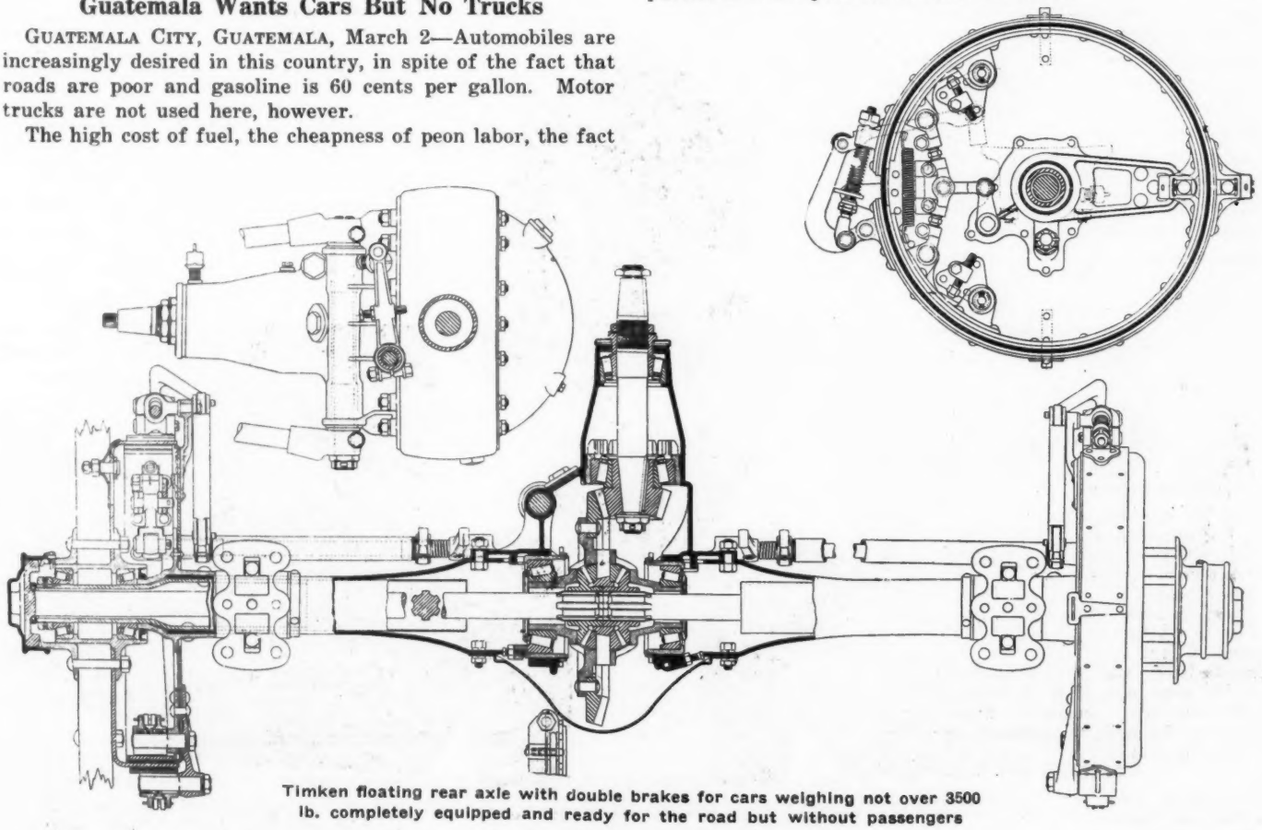
The high cost of fuel, the cheapness of peon labor, the fact that heavy vehicles are likely to injure sewer pipes in the road-bed, and the monopoly of freight service given to one concern by the government, militate against the use of self-propelled commercial vehicles.

The American consular office here has ascertained that there are 150 cars in the Republic, the great majority of which are of American make.

The cost of delivering the cars is high. The transportation on a five-passenger automobile recently brought from New York to Guatemala City was $280, including customs duties.

All automobiles and accessories, except an invoice for $82, were imported from the United States in the first year of the war. The volume of imports has decreased, however, due to financial depression.

A new tariff schedule is proposed to be effective March 15, 1917, but due to the conflicting interests of various political parties it is not possible to state the rates.



Timken floating rear axle with double brakes for cars weighing not over 3500 lb. completely equipped and ready for the road but without passengers

New Weidely Overhead-Valve Four

3½ by 5½-in. Design Develops 50 Hp. at 2400 R.P.M.—Valve Action Carried in Detachable Cylinder Head—Oiling Is By Pressure

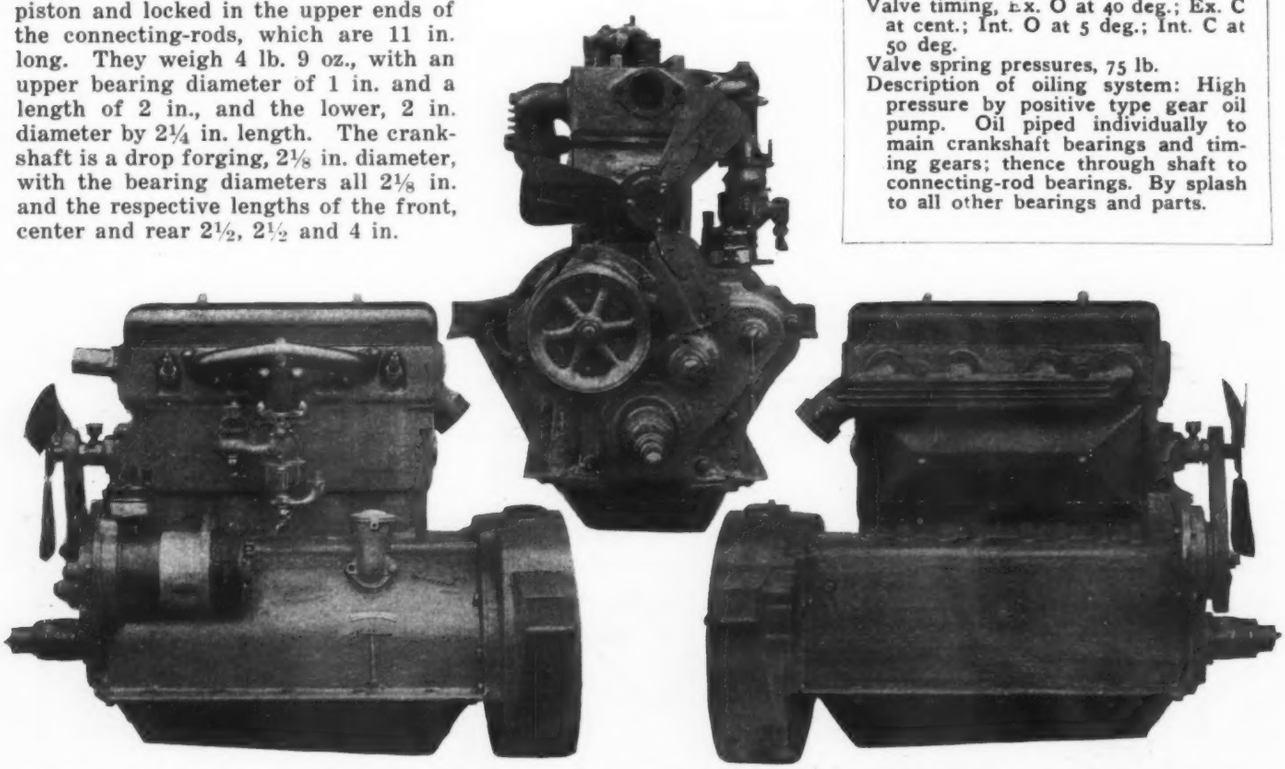
A NEW Weidely engine is just ready to be put through as regular production by the Weidely Motors Co., Indianapolis. This is a block, 3½ by 5½-in. overhead-valve four, developing 50 hp. at 2400 r.p.m., as indicated by the horsepower and torque curves shown herewith.

This engine has the entire overhead valve action carried in a detachable head. The valves are mounted directly over the combustion chamber and are actuated by push rods from the camshaft housed within the crankcase. The valve push rods, although necessarily long in order to carry the motion of the cam from the crankcase to the overhead valves, are guided throughout a large percentage of their length, as will be noted from the accompanying sectional drawings. Over the valve action there is a cover plate which, in combination with the inclosed valve rods, gives a very compact appearing design with a smooth exterior. The combustion chamber is centered over the piston head and is carried entirely in the detachable cylinder head. The piston rises to the top of the main cylinder casting.

The cylinder block is cast integrally with the upper half of the crankcase. The oil pan is pressed steel and carries the oil reservoir and the splash troughs, into which dip scoops on the bottom of the connecting rods. The pistons are iron, 4¾ in. long, and fitted with three rings, all above the wristpin. The weight of the piston with the piston rings and the wristpin is 2 lb., 6 oz. The piston pins are placed slightly below the center of the piston and locked in the upper ends of the connecting-rods, which are 11 in. long. They weigh 4 lb. 9 oz., with an upper bearing diameter of 1 in. and a length of 2 in., and the lower, 2 in. diameter by 2¼ in. length. The crankshaft is a drop forging, 2⅛ in. diameter, with the bearing diameters all 2⅛ in. and the respective lengths of the front, center and rear 2½, 2½ and 4 in.

Specifications of Weidely Engine

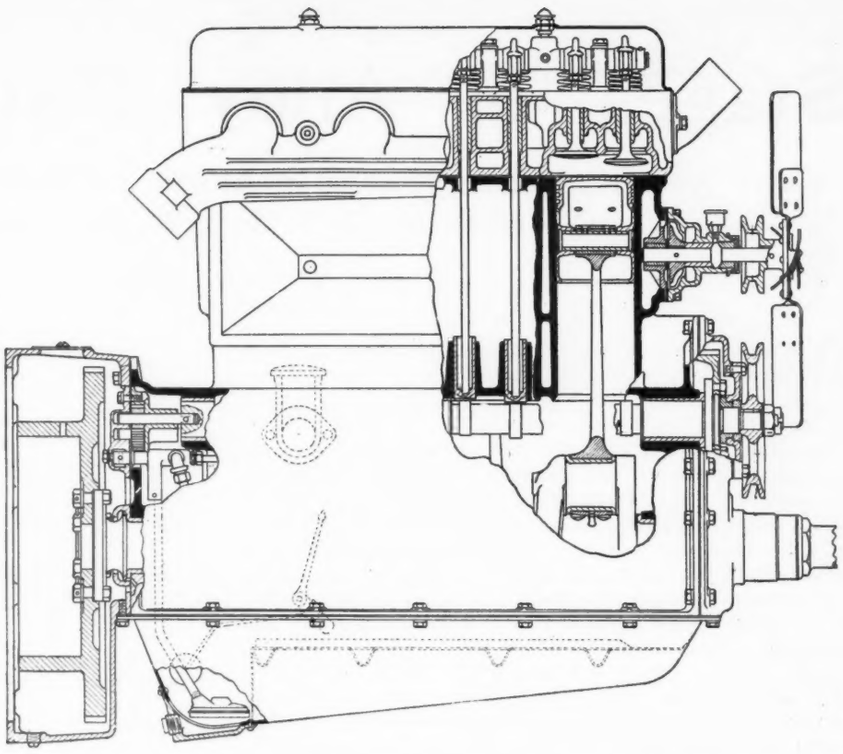
Number of cylinders, four.
Bore, 3½ in.
Stroke, 5½ in.
Displacement, 213 cu. in.
Length of piston, 4¾ in.
Number of rings, three.
Length of connecting-rod, 11 in.
Connecting-rod, drop forging.
Connecting-rod bearing dimensions, Upper, 1-in. diameter x 2-in. Lower, 2-in. diameter x 2¼-in.
Crankshaft diameter, 2⅛ in.
Material of crankshaft, drop forging.
Crankshaft bearing dimensions, 2⅛-in. diameter x 2½-in. front, 2½-in. center, 4-in. rear.
Number of crankshaft bearings, three.
Method of valve drive, helical gears, 1¼-in. face, very wide angle.
Number of camshaft bearings, three—1 7/16-in. diameter x 2¾-in. front, 2⅛-in. center, 1½-in rear.
Dimensions of camshaft, 1⅛ in. between bearings.
Valve timing, Ex. O at 40 deg.; Ex. C at cent.; Int. O at 5 deg.; Int. C at 50 deg.
Valve spring pressures, 75 lb.
Description of oiling system: High pressure by positive type gear oil pump. Oil piped individually to main crankshaft bearings and timing gears; thence through shaft to connecting-rod bearings. By splash to all other bearings and parts.



Both sides and front view of the new Weidely four-cylinder, overhead-valve engine. It has a bore of 3½ and a stroke of 5½ in. Valves are mounted directly over the combustion chamber and the push rods are guided throughout a large portion of their length

The camshaft is driven by helical gears, having a 1¼-in. face width and a wide tooth angle. The camshaft is carried on three bearings and has a running diameter of 1 7/16 in. The length of the front, center and rear camshaft bearing are 2¾, 2⅛ and 1½ in., and between the bearings the diameter of the camshaft is 1⅛ in. The cam followers are flat and bear directly on the cams without intermediate linkage or rockers, and the valve adjustment is at the upper end of the push rod at the point where it bears against the rocker arm. The valve rockers are carried on an overhead rocker shaft extending the length of the cylinder head casting, and the springs are single spirals, having a pressure of 75 lb. The timing is conventional with the exhaust opening at 40 deg. before bottom dead center and closing at upper dead center. The intake opens at 5 deg. past upper dead center and closes at 50 deg. past lower dead center. The valves are 1 13/16 in. in the clear and the lift is 5/16 in.

Oiling is by a complete pressure system, with an auxiliary splash. The pump is a gear type driven off the rear end of the camshaft. The oil is piped individually to the main crankshaft bearings and timing gears and thence through drilled holes in the crankshaft to the connecting-rod bearings. All of the other bearing parts are lubricated by splash, which is supplied by the drain from the main bearings.



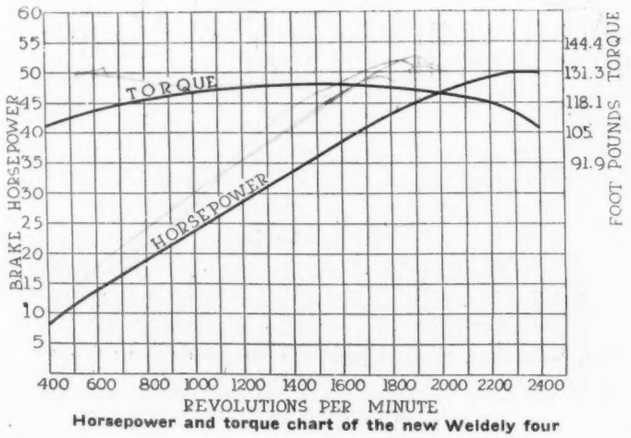
Section through the Weidely overhead-valve four, showing the valve drive mechanism. The piston rises to the top of the main cylinder casting

Unusual Water Intake

Cooling is by a centrifugal water pump, and one of the features which may be noted from the accompanying illustrations is the manner in which the water is led into and out of the cylinders. The water intake passage is located at the front end of the cylinder block, just behind the support, and the outlet is bolted against a flange on the front end of the cylinder head casting. From the cross sectional view it is apparent that the water is carried well up around the valves and over the top of the combustion chamber. The water passages between the cylinder block and the cylinder head are large, giving a free circulation around the metal necessary for holding the studs bolting the cylinder head in place.

The manifolds are separate, with the exhaust on the right and the intake on the left. Both bolt against the cylinder head, and it is intended in the intake to help provide for the low grades of fuel by providing hot spots in the intake manifold. The spark plugs are on the intake side and are screwed into recesses in the side of the cylinder head.

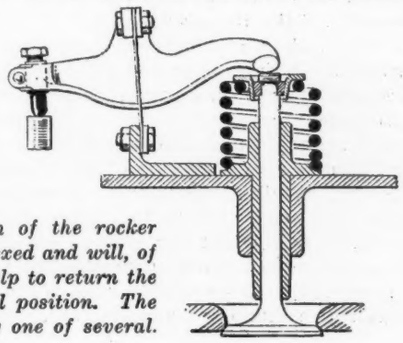
Mountings are provided for the generator and starting motor, with the generator on the front left side of the crankcase taking the drive directly from the timing gears. The installation is shown in the accompanying illustrations. The starter can be mounted as desired, but as shown in the illustrations, special provision is made for it on the rear right side of the crankcase. The flywheel is inclosed in a bolted-on housing.



Horsepower and torque chart of the new Weidely four

Spring-Mounted Valve Rocker

AN ingenious idea for eliminating the fulcrum joint of a valve rocker is embodied in a recent British patent illustrated herewith. Instead of a fulcrum of the conventional kind the rocker has a short piece of leaf spring attached to the center, the other end of the spring being fixed to any convenient point on the cylinder. With each operation of the rocker the spring will be flexed and will, of its own elasticity, help to return the rocker to the normal position. The design shown is only one of several.



Stages in Alloy Piston Design

Eliminating Faults in Aluminum Piston Problem —No Need for Great Length with Latest Types

By Joseph Leopold
Chief Engineer, Walker M. Levett Co.

SINCE obviously the aluminum piston has become a standard member of the modern automobile engine, the question of design should resolve itself into a matter of all-important concern to all automobile engineers. In the past much stress has been laid upon the various alloys—perhaps not enough. However, we shall disregard this subject for the time being at least and review as closely as possible aluminum piston design from the period of its inception, thereby gaining a more comprehensive conception of the present situation.

At the outset it appears that conventionalized as most engineers were to cast iron piston design, their experiments and designs were in accordance with customary practice. The result being that the initial aluminum pistons were made from patterns designed for cast iron pistons. Partly attributable to undeveloped iron piston design, the aluminum piston proved itself anything but a complete success. Manifestly though—in the writer's opinion—this embryonic period was not as disastrous as the subsequent one. In the main, the difficulties experienced with the above designs may be laid to incorrect piston pin location and faulty provision for lubrication.

The next notable attempts seem to be along original lines by which devious special designs were produced. Chief among these was the hour-glass type which, at the time of its introduction was seemingly received without commentable dispute, as a solution of the problem in hand, the result being that a number of manufacturers adopted it as standard. Unfortunately they accepted too much for granted for generally the resulting consequences were decidedly disastrous, having the direct effect of influencing several manufacturers to completely abandon the idea of using aluminum pistons. The principal difficulties with this type were excessive oil passage, distortion, and piston slap. Fig. 1 illustrates the "hour glass" design of piston.

A Die-Cast Type

The next offering of importance to us here was that type of die-cast piston which embodied a scraper ring on the skirt and deep recesses about the wrist pin bosses. The latter being the only means of reducing the wall sections to a reasonable thickness at that stage of die-casting manufacture; since it was necessary to provide for progressive increase of the inside diameters of the die-cast piston from the head to the open end to accommodate a removal of the core in manufacture. Since some metal was required behind the scraper ring and to conform with the above stipulations, the inside diameter of the piston above and adjacent to the upper side to this metal behind the scraper ring had to be smaller, which possessed the effect of producing an abnormally heavy wall section.

As heretofore stated, to obviate this factor the wall was recessed from the outside for a distance of about 45 deg. on the circumference on each side of the piston pin boss. There, however, remained two very heavy sections extending a distance of 90 deg. each on the piston circumference adjacent to and connecting the two reduced sections above mentioned. This will be more clearly understood by reference to Fig. 2.

Presumably the intended purpose of the scraper ring was to dispose of excessive oil passage, which duty, under ordinary circumstances, would no doubt have been executed successfully. However, the designers seemed oblivious of the danger of distortion in this type of piston due to the expansion and contraction of its irregular sections. As far as the writer can ascertain, distortion generally occurred, which effected a recurrence of the difficulties experienced with the "hour-glass" type.

The common tendency at present where die cast pistons are used, appears to be in the adoption of an extra long skirt—one perhaps twice as long, or more—as the diameter of the piston. The claim is instituted by advocates of this design that ample clearance may be maintained without consequent piston

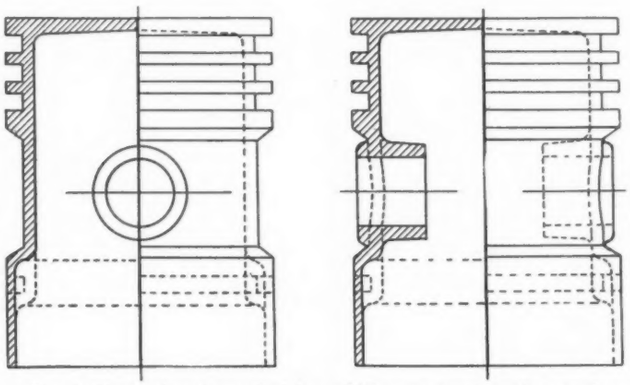


Fig. 1—Hour-glass type of piston which gave trouble when made of aluminum

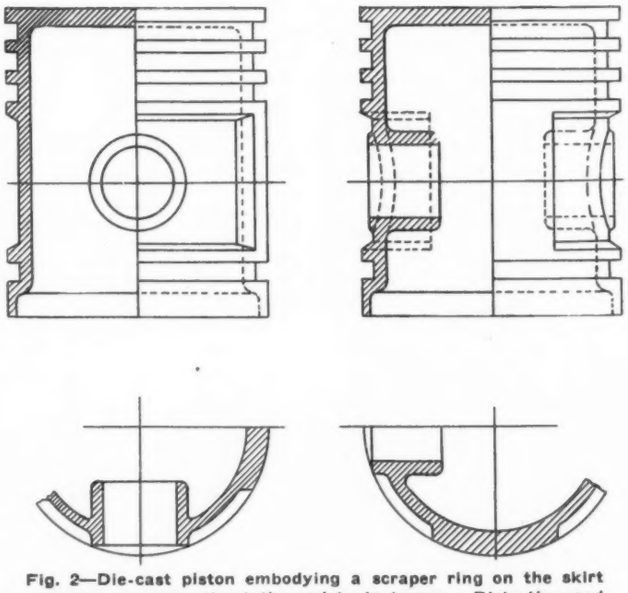


Fig. 2—Die-cast piston embodying a scraper ring on the skirt and deep recesses about the wrist pin bosses. Distortion and other difficulties found with the hour-glass type frequently occurred with this construction

slap. Conceding for a moment that such is the case, I have occasion to wonder why its advocates make use of aluminum pistons. There are several specific cases which I have in mind. Now, obviously by careful attention to design it would be possible to construct a cast iron piston the weight of which would not exceed that of this design of aluminum piston. Consequently they defeat the initial advantage of the aluminum piston; namely, light weight.

If it were impossible to produce an efficient aluminum piston with a reasonably short skirt, there might be some excuse for the long skirt. However, below I beg to tender the results of my experiments.

Results of Experiments

Manifestly we, as manufacturers of sand cast pistons, have never been handicapped by design limitations and have, therefore, been free to conduct our experiments accordingly. I shall not, however, detail the extent and subject of our research, for needless to say we have traversed all lines open to us. I merely wish to propound our latest theory which has been thoroughly substantiated in practice.

As we all know a piston in action has a decided pumping effect. Such constitutes the basic principle of the design illustrated in Fig. 3. Under operation, a quantity of oil is drawn past the ring on the skirt which should not be confused with the ordinary scraper ring: although ostensibly identical its function differs widely; and sufficient oil is retained distributed along the surface of the skirt between the lower ring on the head and the ring on the skirt to effect an oil film which acts as a cushion between the piston and cylinder wall, obviating piston slap even though excessive clearances exist.

Under actual test, we have increased clearances on a 3½-in. diameter piston fully 0.003 in. above normal without causing slap or oil passage into the combustion chamber. The value of such a tolerance in production manufacture is readily appreciable. Another very valuable advantage gained by this oil film is that piston and cylinder wear is decreased to a minimum. This type of piston has proved absolutely satisfactory in both V and vertical type motors. It is now being used as standard by one of the largest manufacturers of V type engines in the United States. The writer ventures to say that it will warrant the title of the universal piston in a very short time. At any rate, it renders unnecessary and cumbersome the former mentioned long skirt piston.

It will perchance be contended that at the present time this design is not applicable in every case due to several reasons. Certain manufacturers for instance mill a connecting-rod clearance in the lower part of their cylinders. If the ring on the piston skirt had to traverse this aperture there might be danger of ring fracture, providing the ring opening lined up in such a manner as to cause the ring to spring out of position.

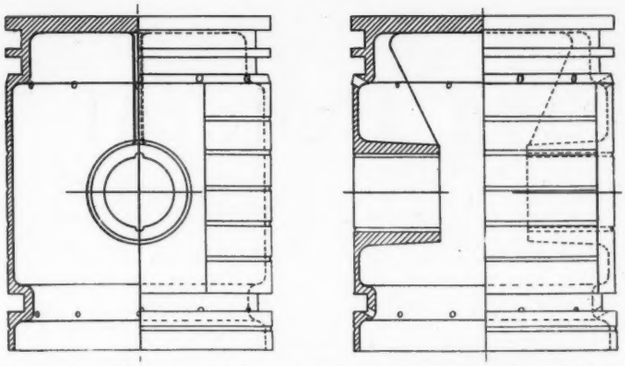


Fig. 3—Piston designed with pumping effect in view. This type has been found very satisfactory from both manufacturing and service standpoints. An oil film acts as a cushion

This difficulty may be obviated by substantially pinning the ring in place on the piston. There is but one objection to the skirt ring in the above mentioned case; namely if the milled portion of the cylinder is wide enough the ring will warp into the aperture during each stroke, causing a slight slap and undue wear on piston, ring and cylinder. However, such a condition exists in but few cases.

There are other engines wherein the pistons ride clear of the bottom of the cylinders to such an extent that if the ring were placed on the piston skirt it would travel entirely out of the cylinder. Of course, we could not expect to use the above type of piston in this case.

Build Engine Around the Piston

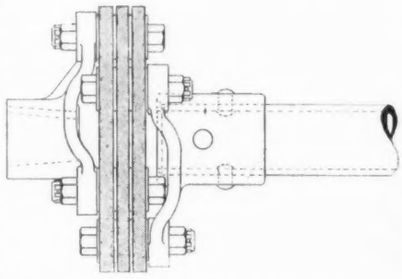
It is my impression that James E. Diamond once made the statement that a truly efficient engine should be built around the piston. In this he has my profound support. I am strongly of the opinion that coincident with the time when such a proceeding is realized and put into practice by engineers generally, the aluminum alloy piston will constitute a standard member of all automobile engines. It is essentially a logical solution of the evils which we formerly had to contend with in moderately high speed engines and I believe we will all agree that while perfection in design has perhaps not yet been attained, the aluminum piston in its present state is unquestionably superior to its predecessor, the cast iron piston.

Experiments Show Strength in Fabric Universal

FOLLOWING the reading of an S. A. E. paper on universal joints at Cleveland in May last, there was a good deal of discussion regarding the possibilities of joints made from fabric, or leather without any moving surfaces which require lubrication. Several speakers gave different data concerning rough tests they had made which all went to show that ultimate failure took place at the bolt holes. How long a fabric universal would last in service was not made clear.

Type of Washer Important

The Service Motor Truck Co., Wabash, Ind., has been trying out a fabric universal developed for omnibus transmission in London, and state that the results so far have been encouraging. Much apparently depends upon the type of washer which is employed for spacing the disks apart on the bolts.

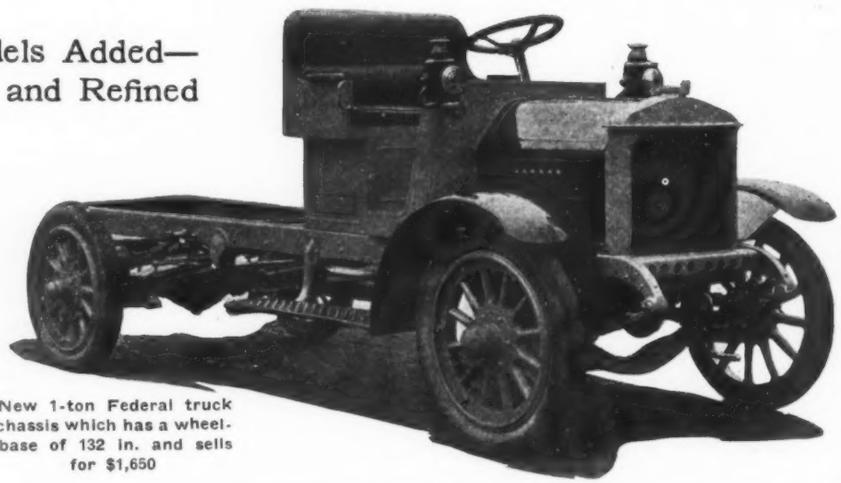


Fabric universal design tested

Some tests to destruction made statically on the bench by the Service company showed that there was considerable variation in the strength of different fabrics, and that a good fabric was immensely strong. Using a joint of the type illustrated, a test was made with the complete propeller shaft assembly with a universal at each end, and the tubular driveshaft was twisted in two without the disks showing any set or, indeed, that the strain had affected them in any way. There were three disks in each joint, 7½ in. outside diameter and 2¾ in. inside and 5/16 in. thick. The bolts were ½ in. and the washers 1½ in. of a fluted type to give a good grip. The tube which failed was 2 in. diameter outside with a No. 10 gage wall.

Five Federal Trucks for 1917

1-Ton and 5-Ton Models Added—All Models Redesigned and Refined



New 1-ton Federal truck chassis which has a wheelbase of 132 in. and sells for $1,650

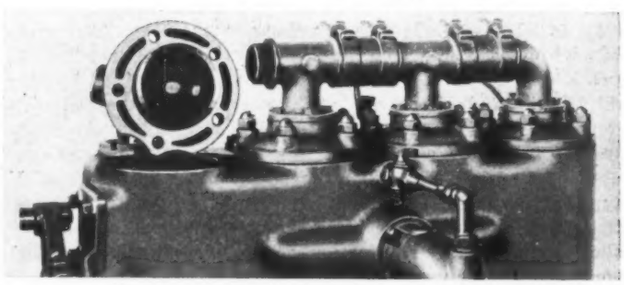
FIVE models in place of three will be put on the market by the Federal Motor Truck Co., Detroit. The two additions are a 1-ton and a 5-ton, both of which are new, although they follow along the same lines of general design as the other Federal models. The 1½, 2 and 3½-ton models, have all been refined and redesigned in a great many particulars, so that the Federal announcement at the time of the Boston show really includes five new models, or an entirely refined line.

Some of the new features of the Federal trucks are a new engine designed solely for truck use and having a five-bearing crankshaft. Another feature of the engine is that, although the cylinders are cast in block, the cylinder heads are cast separately so that one may be removed at a time. Three power plants take care of the entire line. The 1-ton has a 3½ by 5⅛, 25 b.hp. unit; the 1½ and 2-ton have a 3¾ by 5⅛, 30 b.hp. unit, and the 3½ and 5-ton trucks, a 4¼ by 5½, 40 b.hp. These engines are all similar in design except that the timing gear layouts are somewhat different, due to detail differences in the water pump and magneto shafts. The 1-ton model is not equipped with a governor, whereas the others are.

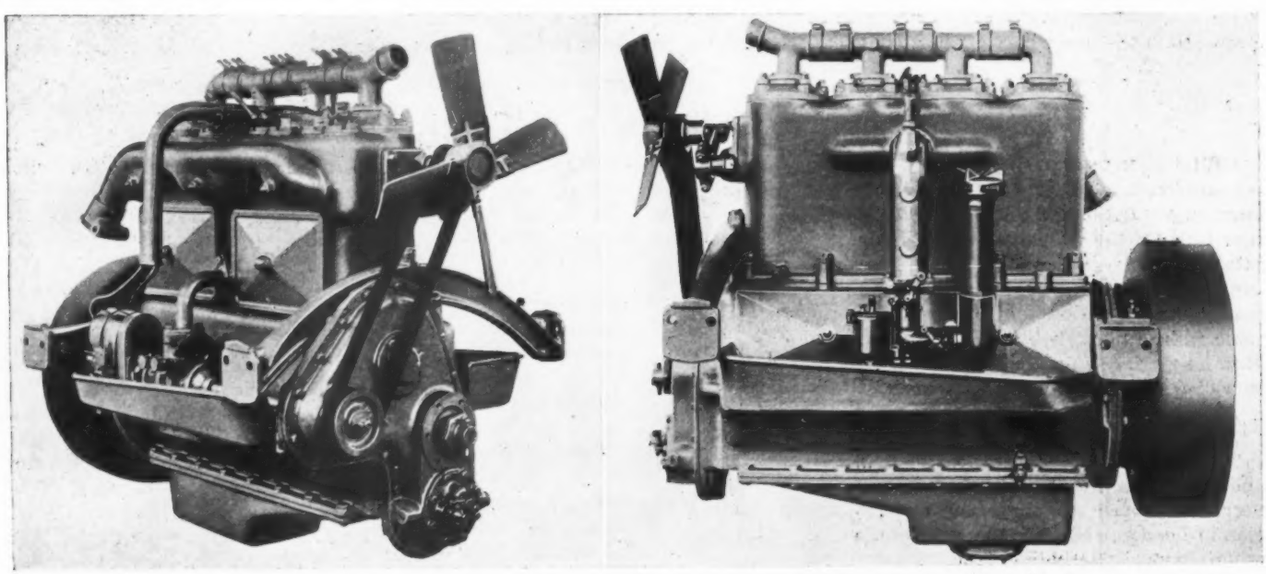
Entire Line Redesigned

Some of the other changes in the designs will be noted in the following description, although it may be stated in passing that the line may be considered as redesigned and refined.

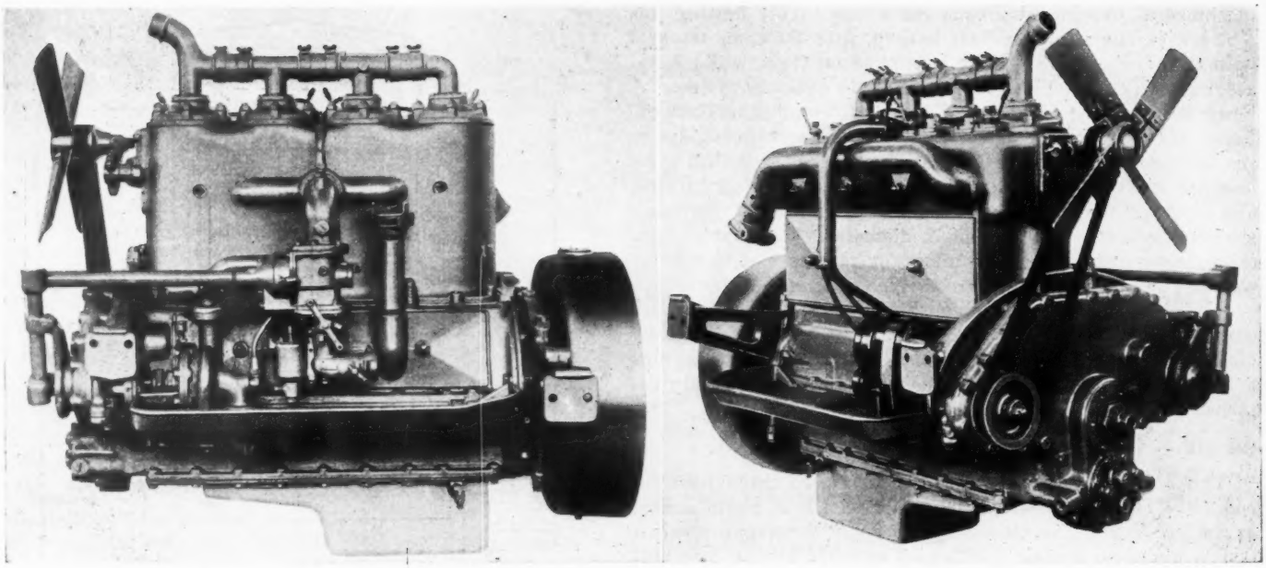
The capacities in pounds are 2000, 3000, 4000, 7000 and 10,000, and the body allowances for these capacities are, respectively, 900, 1050, 1200, 1600 and 1800 lb. On these models the wheelbases are 132 in. on the 1-ton; 144 in. on the 1½-ton, and on the 2-ton there are four lengths: 120, 144, 156 and 168 in. The 3½ and 5-ton trucks are made up in two lengths each of 156 and 180 in. Another point at which the different



Detachable cylinder-head in new Federal truck engine



Both sides of the 3½ by 5⅛-in. engine used in the new 1-ton Federal truck. Note intake passing through cylinder block to preheat fuel. This unit develops 25 b.hp.



Engine used in 3½ and 5-ton Federal trucks. It is 4¼ by 5½ in. and is credited with 40 b.hp.

trucks vary is in the treads and loading spaces. The front treads run from 56 in. in the 1-ton unit up to 69¼ in. in the 5-ton, and the rear treads from 58 in. in the 1-ton up to 70½ in the 5-ton.

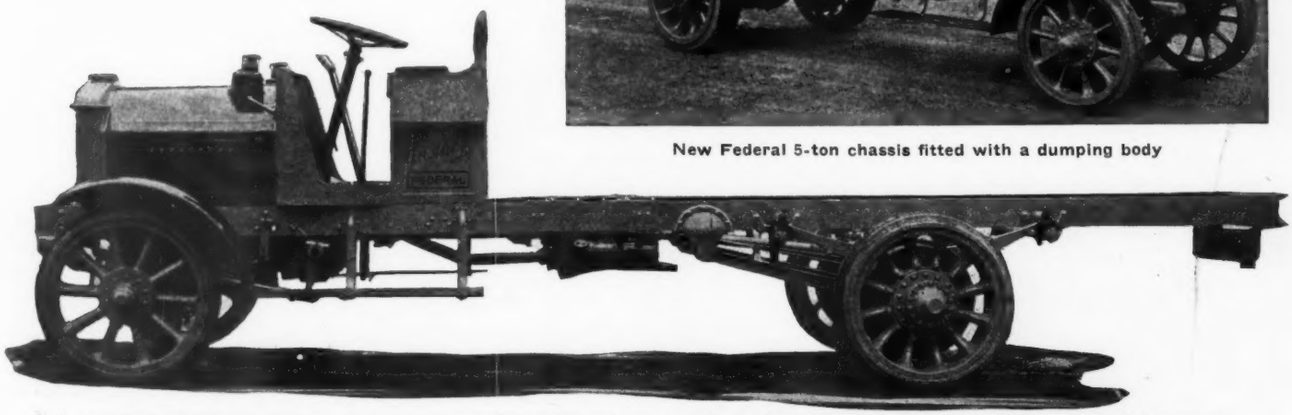
The prices of the five models are: 1-ton, $1,650; 1½-ton, $2,100; 2-ton, $2,300; 3½-ton, $3,000; 5-ton, $4,000.

The engines are four-cylinder, L-head block designs, having bores and strokes of 3½ by 5⅛, 3¾ by 5⅛ and 4¼ by 5½ in. The cylinders are cast from 20 per cent semi-steel with the waterjacket extending to the crank-case. Each head is separate and can be removed without disturbing the others, giving increased ease in casting and at the same time giving a maximum degree af accessibility.

The pistons are of the same kind of iron as the cylinders. They are fitted with five Burd high-compression rings, four being at the top of the piston and one at the bottom. In manufacture, the pistons are assembled with the rods and are weighed, and must check within ¼ oz. The piston pins are of low carbon seamless steel tubing, case-hardened and ground. The pin is held stationary in the piston bosses and has its bearing in a Non-Gran bronze bushing secured in the connecting-rod. The wristpin bearing is lubricated by pressure as will be noted. The connecting-rods are I-beam section of 40 carbon steel, drop-forged and heat-treated, and are furnished with nickel steel bolts.

One of the special features of the engines used in the Federal trucks is the five-bearing crankshaft. The main bearings are all lined with Fahrig metal, held in place by steel dowels. Adjustment is taken up by means of laminated shims and the end thrust on the crankshaft is taken by flanges on each side of the rear main bearings. The crankshaft itself is made of chrome-nickel steel, drop-forged, heat-treated and

New Federal 5-ton chassis fitted with a dumping body



Federal 3½-ton chassis, showing substantial radius rod construction. Note the long overhang of the frame at the rear

machined all over, making each rod a very highly finished job.

A low carbon steel camshaft is used, with the cams integral with the forging. This shaft is carried on three white metal bearings, all of which are fed by the main pressure system. A large flange on the front end of the shaft running against the flange of the front bearing serves to take the end thrust, due to the helical timing gears. The camshaft is machined all over, case-hardened and ground. Solid forgings of tungsten steel are used for the valves, with inlet and exhaust of the same sizes. The valves are 1¾ in. in diameter. Removable valve stem guides are employed to allow for replacement in case of wear. The tappets are mushroom type ground to size and can be removed from the tappet bushings by loosening the fork crab which holds them in place. This mechanism is entirely inclosed by a plate which keeps out the dirt. The valve springs are held in place by a split collar which can be readily detached when removing the springs.

Force-Feed Oiling

High pressure force feed lubrication is used throughout the engine. The oil is circulated by means of a gear pump located in the gearcase. The oil enters the pump through a strainer and is forced to a main lead which supplies all the camshaft and main bearings through ducts which are integral with the upper case. At normal running speeds of 1200 r.p.m. the oil pressure runs up as high as 50 lb. to the square inch, so that the oil exercises a cooling effect on the bearings, as well as lubricating them. Cooling is by pump circulation and ignition by a single high-tension magneto.

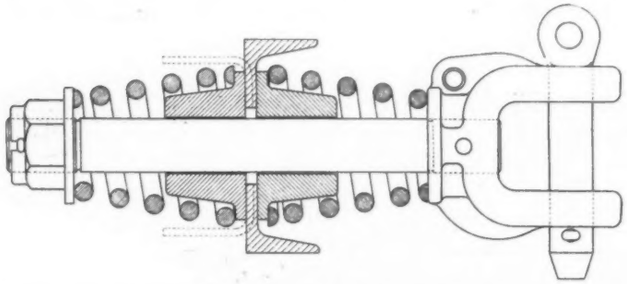
One of the features of the engine which may be noted is that the intake port passes through the cylinder casting, allowing for a preheating of the fuel mixture to take care of the low grades.

Another feature which has to do with accessibility is the placing of a large cover plate on the left side of the crankcase, through which the rods can be disconnected so that the piston and rod assemblies can be pulled up through the removable cylinder head.

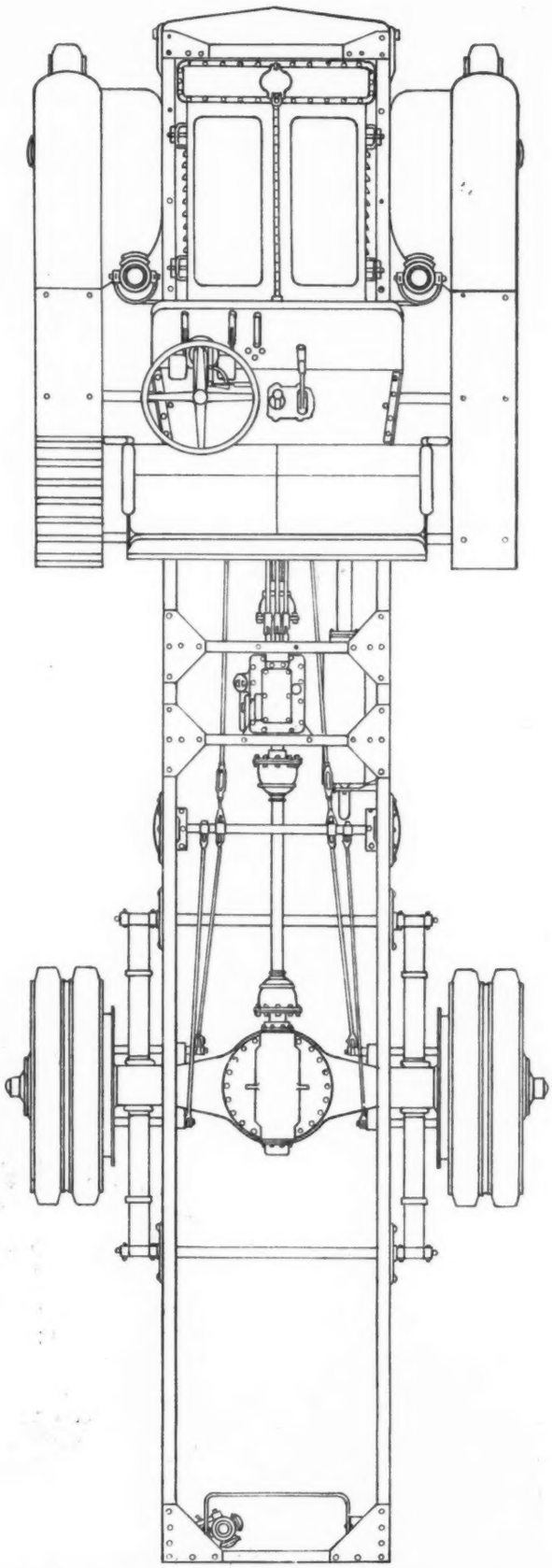
The governors used on the four larger models are centrifugal type grid throttle valves. These are entirely inclosed and are sensitive.

Clutch Is Accessible

The clutch is a Borg & Beck single dry plate design, with asbestos fabric-friction rings completely inclosed in a standard bell housing and bolted to the crankcase. The clutch housing also carries the control pedals and levers. It has been made extremely accessible so that by removing the cover plate the clutch can be worked upon. In making repairs upon the clutch, it is only necessary to disconnect the universals and remove the cover plate, whereupon all the necessary parts are exposed. There are two universals between the clutch and the amidship gearbox and two universals between the gearbox and the rear axle, giving four universals in the drive between the engine and the Timken-Detroit worm drive rear axle. The gearbox is of Federal design and manufacture, with all the shafts carried upon annular balls, except the front end of the main shaft



Drawbar mounted on the rear of Federal tractor models which are furnished in the 1½ and 3½-ton models

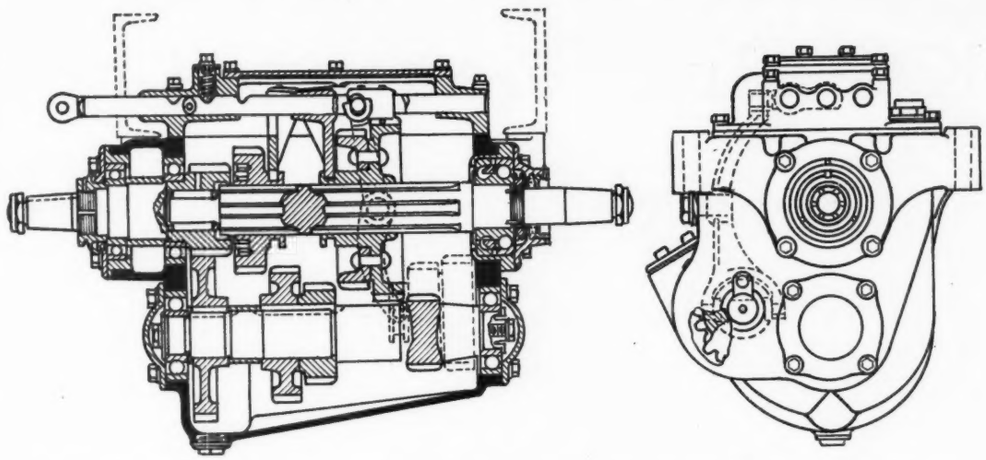


Federal 5-ton chassis in plan view, showing strong frame construction and mounting of power plant and gearbox. The frames are of rolled section and 5 in. deep

which is carried on a roller bearing. The 1-ton has three speeds and all the others have four speeds. The shaft for the sliding gear has six splines. Both the front and rear propeller shafts are tubular, and the universals are the cross pin design. The rear axles are Timken-Detroit worm-drive types.

Gear ratios are as follows:

1-ton	7 to 1
1½-ton	8.5 to 1
2-ton	9.25 to 1
3½-ton	10.3 to 1
5-ton	13.6 to 1



Section through Federal gearbox. All the shafts are carried on annular ball bearings except the front end of the main shaft, which is carried on a roller bearing

The drive is taken through radius rods, having ball joints at the rear ends. These rods are malleable steel castings. The frames are pressed steel channel section on the 1, 1½, and 2-ton models, but on the 3½ and 5-ton they are of rolled section. The 3½-ton channel is 6 in. deep and the 5-ton channel is 7 in. deep. The depths of the pressed steel channel members are, 5 in., 5 7/16 in., and 5½ in. for the 1, 1½, and 2-ton jobs, respectively. The frame width is 38 in. on all models, and the height from the ground to the top of the frame is, 29 in. on the 1-ton, 31 in. on the 1½-ton and 2-ton, 34 in. on the 3½-ton, and 37 in. on the 5-ton. The springs are vanadium steel and are 40 in. long in front for the three smaller models and 144 in. for the two larger ones. In the rear springs for the 1-ton model are 52 in. long; for the 1½ and 2-tons, 54 in., and for the 3½ and 5-ton models, 56 in. The springs are shackled at both ends and supported by rods which go across the frame. Oil lubrication is used on all shackles and on the clevises of the steel cross rod. The steering gear is an irreversible worm and worm wheel, with 18 in. hand wheels on the three smaller models and 20 in. on the 3½ and 5-ton trucks.

An interesting gasoline tank is used, this being a fine example of drum steel work, having capacities of 20 gal. for the three small trucks and 28 gal. for the larger models. The tank is fitted with a flange which carries the shut-off valve, drain cock, and trap, as well as the connection to the carbureter. These are so mounted that they can be operated from the outside of the frame. The radiator has a detachable vertical tube core with tank and sides of Parker rustproofed pressed steel.

The seat is all steel with a fully upholstered back, and in the 3½ and 5-ton models it has divided cushions to accommodate three persons. The dash and toe boards are pressed steel, as are also the fenders, which are a crown type with apron. Pressed steel is also used for the running boards and hangers. The running boards are filled with hard wood.

Steel Wheels on 5-Tonner

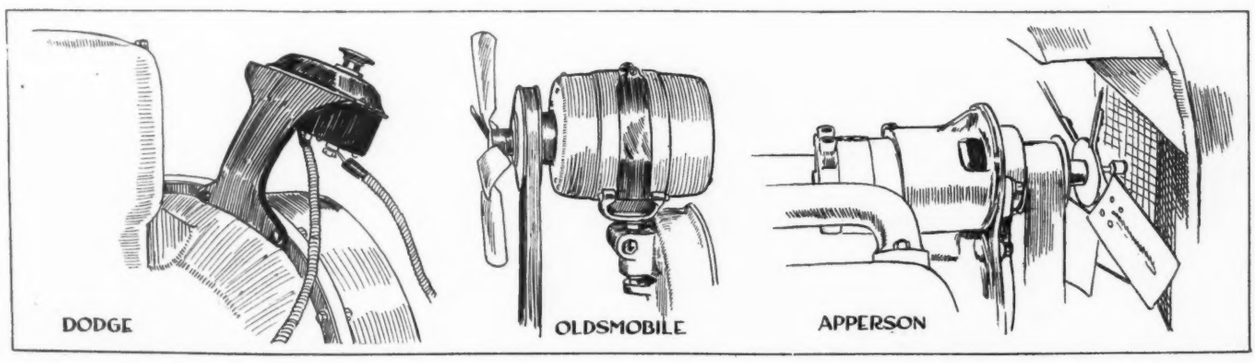
The wheel equipment is artillery type of wood for all except the 5-ton, which has steel wheels with hollow spokes and felloe. The tire equipment, regular and optional, is as follows:

Model S, front 34 x 3 in., rear 34 x 4 in. solid S.A.E. standard. 35 x 5 front and rear pneumatic $25 net extra.
Model T, front 36 x 3½ in., single rear 36 x 5 in., solid S.A.E. standard.
Model U, front 36 x 4 in., single rear 36 x 7 in., solid S.A.E. standard Or dual rear 36 x 4 in., solid S.A.E. standard
Model W, front 36 x 5 in., single rear 36 x 5 in., solid S.A.E. standard. Or single giant 36 x 10 in. rear, net extra $40.
Model X, front 36 x 5 in., dual rear 40 x 6 in., solid S.A.E. standard. Or single giant, 40 x 12 in. rear, net extra $60.

Capacities	Model	M.P.H.	Wheel Diameter	Capacities	Model	M.P.H.	Wheel Diameter
1-ton	S	18	34	3½-ton	W	12	36
1½-ton	T	15	36	5-ton	X	10	40
2-ton	U	13	36				

Two tractor models are furnished in the 1½ and 3½-ton models. These are mounted on a short wheelbase and are equipped with turntable or rocking fifth wheel, made with a special bracket for Federal trucks. A neat form of drawbar has been mounted on the rear of these and is illustrated in the accompanying drawing.

Details of Design—Starting Switch and Generator Mountings



Keeping Men at Their Jobs

Firestone Decreases Labor Turnover, Reduces Accidents, Improves Punctuality and Increases Productive Capacity of Its Workers by Building Better Industrial Relations on a Foundation of Practical Ideals

By Allen Sinsheimer

¶ *EDITOR'S NOTE:—This is the third of a series of articles based on an intimate study of the work being carried on by our large automobile, motor truck, tire and accessory makers to improve industrial relations. Better home and working conditions are two features that are emphasized. The promotion of health by the B. F. Goodrich Co. and the Goodyear Tire & Rubber Co.'s solution of the housing problem for its workers were features of previous issues.*

FIVE years ago the Firestone Tire & Rubber Co., Akron, Ohio, was afflicted with every labor problem that confronts modern industry. There was an astounding labor turnover. The men who left the company's employ averaged between 20 and 30 per cent monthly. Absentees from work caused figures of 15 to 20 per cent each 30 days. Accidents injured 4 per cent of the entire force every month. And the damage to machinery wrought by new and ignorant workers, the defect of product caused by masses of untrained and unskilled men, the accident compensation amounting to exorbitant figures, and the unreasonable cost of the employment department were problems much like those most employers encounter now.

In 1912, Robert E. Lee, factory superintendent, appeared before the officers of the company and asked for a clubhouse for the workers, explaining the need for a common meeting place where the men could mingle, bathe, play, read and become more or less a body of friendly individuals. He had difficulty securing the swimming pool without the clubhouse. The idea was too new. It was a period when employers, struggling to perfect their products and plants, overlooked the human element and felt that it was something apart from the industry. Last year the company built the clubhouse at a cost of $350,000—around the swimming pool. This year it voted to give Mr. Lee $1,000,000 to spend on the welfare of the workers as he sees fit. All of which proves that he has accomplished a change of thought in the administrative headquarters and has convinced them of the soundness of his plans.

The company has met with a remarkable success. It has decreased labor turnover, reduced accidents, lowered the number of daily absentees, and increased the contentment and productive capacity of its workers, besides obtaining all the other benefits which accompany such results. It has discovered the recipe that makes improved industrial relations between employer and employee. It has learned the ingredients of that recipe and their correct proportions. It is using a goodly measure of ideals mixed with a like amount of practical action which usually produces results where the human element is involved.

To begin with, Mr. Lee believes that every man in the factory is his equal in rights, and that low wages, overwork, long hours, injustice and unhealthy working conditions are not the means to a maximum production of a high quality of product. On this philosophy he has erected his system for sound industrial relations—a system that is neither entirely a matter of practicability, nor wholly a structure of ideals but rather one, carefully and thoughtfully, built of practical ideals.

Regulating Discharge of Workers

For example, Mr. Lee observed that many men were discharged by foremen because of petty spite, ignorant authority or jealousy. That seemed to him to be a clear instance of injustice. It did not conform with his principles. He took the authority of discharge from foremen and placed it with department managers. Here, too, he found the same evils. Men were discharged because of personal enmity and for other than business reasons. Again, he moved the right of discharge higher. This time that right was vested in just one man—himself—and to-day no one among the more than 8000 Firestone factory employees can be discharged except by the factory superintendent. This, of course, was a move prompted by the man's ideals. Here are the results:

When the foremen had the right of discharge, between ninety and 100 men were released each week. When the right was given only to department managers those figures were reduced to twenty-five men per week. Since Mr. Lee has taken the matter of discharge upon himself, a period of 10 weeks, five men have been discharged in all.

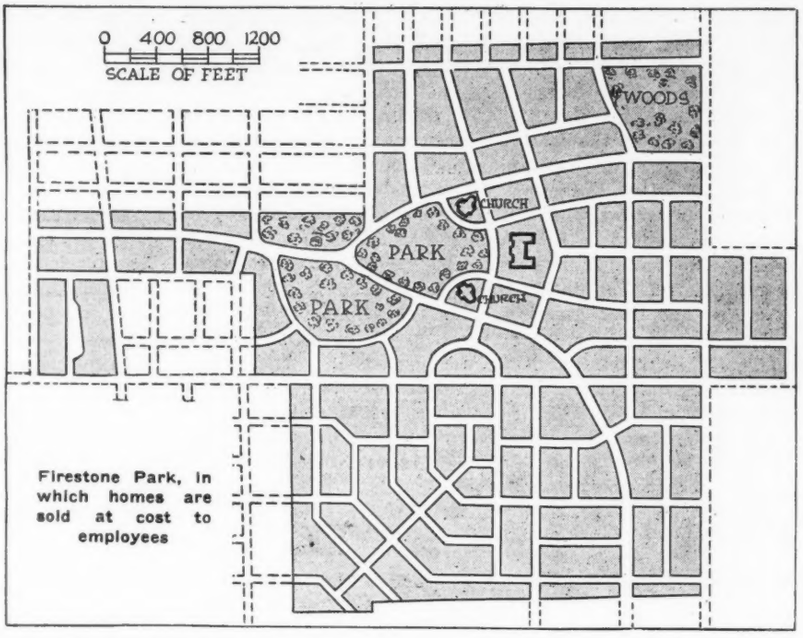
Objections were made to the plan in which it was claimed that the procedure would weaken discipline, and that though there might be an inherent antagonism between foremen and workers, the very word foremen implied "first men," right of hiring and firing and power of authority. As a matter of fact, Mr. Lee has found that no weakened discipline has

How Firestone Reduced Labor Turnover 18% Monthly in 2 Years

Regulated Right to Discharge Workers
Adopted Standard 8-hr. Working Day
Instituted Permanent Day Force
Newer Employees in Night Force
85% Glass in New Factory Walls
Cared for the Health of Employees
Developed Firestone Park for Homes
Sold Homes to Employees at Cost
Provided Clubhouse Costing $350,000
Aided Workers to Buy Firestone Stock

replaced the inherent antagonism and that instead, better workmen, more efficient foremen and a powerful co-operative spirit has been the result. Foremen, of course, still retain some authority. They can, at all times, take up subordination or inefficiency with the department managers or Mr. Lee, and this power, they find, is sufficient to maintain the necessary discipline.

Probably the clearest description of Firestone operations is to say that the factory superintendent always puts himself on a level with the workers. When they require aid they come to him. If there is a personal quarrel he usually is the referee. If they need financial help he extends it. Within the last 3 years he has loaned $30,000 to the employees without security. More than $29,500 has been paid back, and he expects to receive the balance when the men can afford to pay it.



Firestone Park, in which homes are sold at cost to employees

Cashing in on Loyalty

Recently he walked out of the factory and found two employees engaged in a loud quarrel on the street. He took them into his office. One owed the other 50 cents and the creditor had taken it upon himself to seize the debtor's coat until payment was made. Mr. Lee questioned the debtor:

"Do you owe him any money?"

"Sure, I owe him 50 cents, but I won't have it until payday and it is cold. I need my coat."

The superintendent turned, smiling, to the creditor, and calling him by name—he knows the majority of the men by their first names—said:

"Well, John, this man is cold. He needs his coat. Will you give it to him?"

John refused to part with the coat until he received the money. Mr. Lee gave him the 50 cents. The debtor drew a pencil from his pocket and commenced to write an order on his wages for the amount.

"No," said his employer, "you can stop in here and pay me when you want to."

The workers left, each satisfied. A little thing, this may seem, but—the debtor was overheard to remark later that he "would fight for this company if they asked me to." Which implies that the little deed involving the insignificant sum of 50 cents had created a loyalty in an employee, which might be estimated at a worth many times its cost.

However, there are matters, other than these little ones, that come under the supervision of Mr. Lee. There is the management of the factory, the clubhouse, the park where Firestone workers may purchase homes at cost, the insurance plan, and the profit-sharing system—all under his direction and displaying in their methods and results the principles on which he operates.

Reforming the Shift System

The most important act Mr. Lee has performed is undoubtedly his radical change of factory operation. About 36 months ago, he observed, with dissatisfaction, the day and night shifts by which the men worked for 2 weeks by day and then 2 weeks by night, in about the same way as the majority of the automobile and tire factories now operate. The plan appeared injurious. He could not understand how a man who passed 2 weeks at night work and the following 2 weeks at day labor could be a healthy, happy and contented worker. Working by day and then changing to work by night, he felt, was certain to injure the worker's habits, produce restless sleep, harm the health and consequently ruin his ability as a workman. Besides, the men who drifted into Akron soon learned to dislike the work and departed for more congenial localities.

This is the situation as improved:

1. An 8-hr. day was adopted.
2. Piece work pay was increased to provide the same wages as with the 9-hr. day.
3. A priority rule was put into effect and the day shift made permanent.

This last was the most important step.

Sixty per cent of the entire force, picking them by their length of service, was made then into the day shift on a permanent basis. The remainder was placed in a permanent night force. As soon as a vacancy occurred in the day shift, or the demand came for additional workers, the men with the longest service record in the night shift were transferred to the day organization. Once a man was made a member of the day force he was assured that his transfer was permanent.

The result was amazing. In the first place, the Firestone company has expanded to such a degree within the past few years that all of the men who were with the company 2 years ago are now on the day shift. The employment office has been besieged by men seeking employment where there is an opportunity to secure steady day work. The labor turnover which was 20 per cent monthly in 1913, dropped to 6 per cent in 1914 and to less than 2 per cent in 1915. It has risen slightly in the last year because of the increase of new men. The organization was composed of less than 5000 men a year ago and it is now a force of more than 8000. The accidents which were injuring 4 per cent of the men per month have reached the point where less than 0.08 per cent of the workers come to harm, and this despite an increase of 100 per cent in the number of employes.

The present turnover is still less than 2 per cent among the 60 per cent of the men in the day force. It has increased only among the night force, which is a sort of crucible to eliminate drifters and floaters and laggards.

85 Per Cent Glass Factory Walls

In addition a medical and dental department was installed and the new factory buildings erected in which the wall space is 85 per cent glass. A few years ago, it was no uncommon matter for a large factory to suffer the loss of ten men yearly in every 1000 through death either by ordinary illness or by accident. On which basis, Firestone, with its

4400 men would have lost forty-five men per year. In the last 3 years, the company has only lost ten men, seven of whom were killed by a dangerous railroad crossing near the factory. This record Mr. Lee attributes to the considerable and unusual amount of window space, the health and happiness of the men, produced by the permanent day work, the use of the swimming pool and general sanitation.

Firestone is very solicitous of the health of the individual. Recently, a worker who had always been an excellent producer was noticed to be behind his usual record. He was sent to the factory physician, who reported him suffering from a heart lesion, due to the work of building up tires, at which he had been engaged, being too strenuous. He was quickly transferred to lighter work, given medical treatment and soon regained his usual working speed. The dental clinic saves many times its cost. Formerly, when a worker suffered from tooth-ache, it meant a loss of a day both to the company and the individual. Now he is sent to the clinic where 15 or 20 min. suffices to relieve the pain and allows the man to continue his work.

The average wage throughout the factory is $4.30 per day and ranges from the minimum of $2.75 to $6.50.

Developing Firestone Park

Six years ago, Akron had a population of 65,000. To-day it has more than 130,000 within its boundaries, of whom 51,000 are in the rubber industry. The vast increase has caused evil housing conditions, forced many to sleep and live in unhealthy surroundings. To overcome this condition so far as was possible, the company purchased a plat, called it Firestone Park, and proceeded to improve it and erect homes at reasonable purchase rates for its employees.

The allotment is 2400 ft. from the Firestone factory. It is in one of the most beautiful sections of the city where the air is dry and clear and the ground is sufficiently high to afford a view of the surrounding country and to insure healthy living conditions.

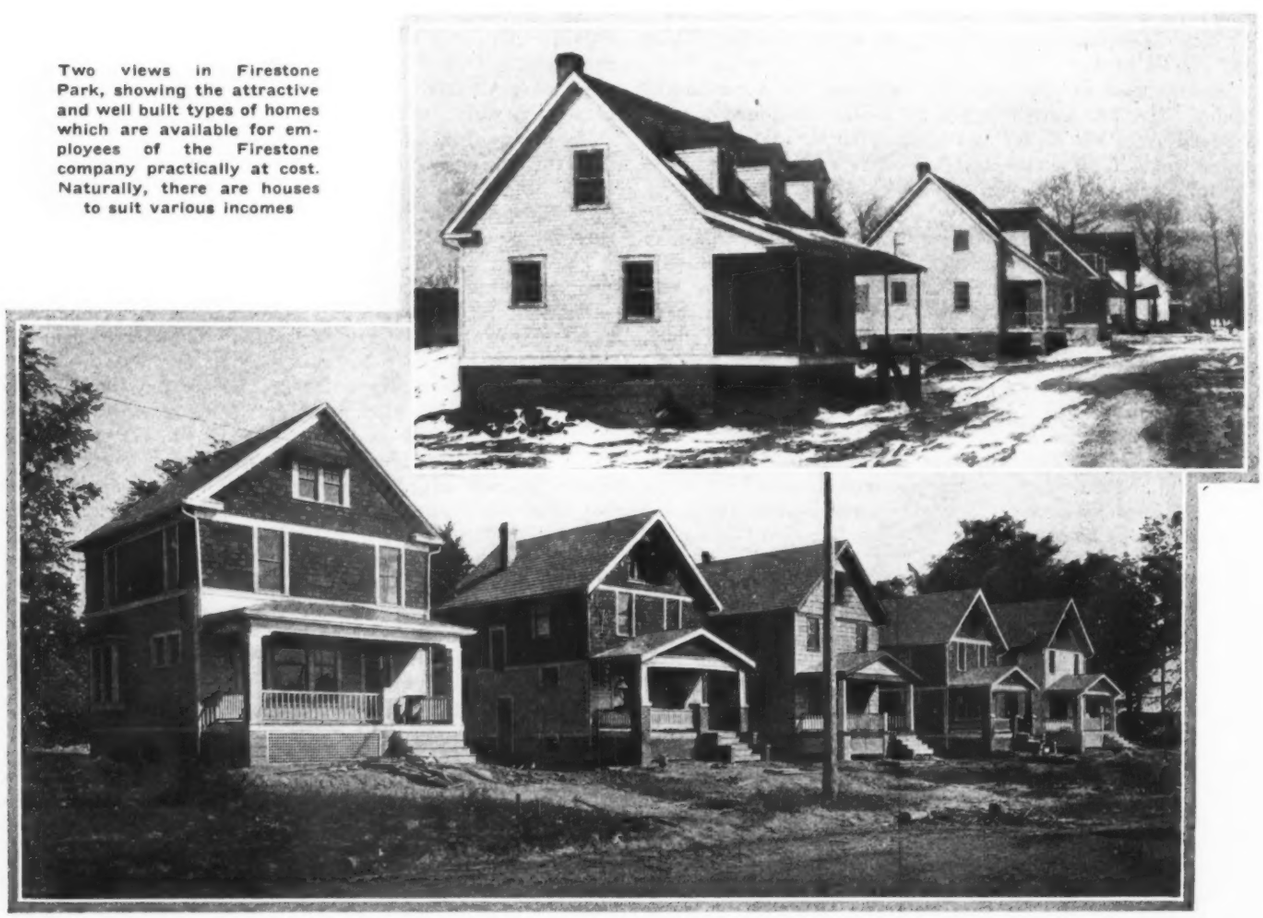
The entire plat allows for the construction of approximately 900 homes and the improvements will, in all, total an expenditure of $650,000, which includes sewers, storm drains, water, gas, electric lights, sidewalks and paved streets.

In the center of the plat the city school board has secured large grounds for the public school and near it will be a 16-acre park for the enjoyment of the property owners and their children. Plenty of trees and shrubbery has been added. Over 200 houses are under process of construction and more than 100 others have been occupied. Since 873 lots have been purchased, the company has decided to add more territory and will extend the boundaries to include space for another 1300 lots.

The present plat of 220 acres was purchased at $1,200 per acre. There are four lots to each acre deducting for improvement space, so that each lot costs $300 and with $625 added for improvements makes a total of $925, which is $25 more than the Firestone employees pay for them. The company has donated the property for the public school, the park and the several churches which are to be erected.

Houses Sold at Cost

The workers purchase the lots or houses by a payment of 5 per cent with their order and make monthly payments of 1 per cent, out of which the company pays interest on the investment, insurance and taxes. The houses are erected by a real estate company formed by the Firestone concern as a subsidiary corporation, if the workers so desire, and are sold to them at prices ranging between $2,200 and $3,000.



Two views in Firestone Park, showing the attractive and well built types of homes which are available for employees of the Firestone company practically at cost. Naturally, there are houses to suit various incomes

which are based on actual cost. Any persons other than Firestone employees desiring to make purchases are allowed to do so, but must pay 10 per cent more and also have to pay 10 per cent down with their purchase.

An allowance of 6 per cent is made on the house if the workers want to assume the cost of insurance. There is no assessment made on lots or houses for improvements since this is all estimated in the monthly payments.

The enterprise is costing Firestone approximately $1,500,000, but it is believed that sales to employees and others and the interest and the profit derived from sales to outsiders, will make the transaction an even break when completed. Thus many of the workers will own their homes, live healthy, care-free lives, be in a position where they will not care to leave the company's employ, and the cost to the company will amount to practically nothing.

The Profit-Sharing Plan

A few weeks ago, the company gave a dinner to its workers and announced a new profit-sharing plan whereby employees could secure the Firestone common stock by payment of $100 per share, this price being maintained to March 1, 1917. Since the stock lists at $140 to $150 at this time, the act was virtually a gift of the difference on each share to the purchasers. Under the plan employees can buy shares in proportion to the length of continuous service as follows:

Service	Shares
Less than 6 months	1
6 months and less than 1 year	2
1 year and less than 2 years	3
2 years and less than 3 years	4
3 years and less than 4 years	6
4 years and less than 5 years	8
More than 5 years	10

The stock may be purchased for cash, part cash, or part deferred payments or all deferred payments. The deferred payments bear interest at 6 per cent and are subject to the following conditions:

Payments of subscription shall be weekly installments, paid in cash or deducted from the salary or wage of the worker, as the employee may elect.

The minimum payment is 50 cents per week for 1 share, with an additional 10 cents per week for each additional share subscribed.

The minimum payment for employees who are paid semi-monthly is $1 each pay-day for one share and 20 cents per share each pay-day for each additional share subscribed.

Additional payments in excess of this minimum may be made in any amounts at any time as the subscriber may elect.

Dividends on the stock will be credited to the subscriber's account as additional payments. When the stock has been fully paid for, dividends will be paid directly to the employee.

When through accident, sickness or other cause the employee is unable to meet his payments, he may apply to the employees' stock department, which will extend the time of payments if circumstances justify.

All payments are to be made to the employees' stock department at the Rubber City Savings Bank, a bank in which the company is interested and which was opened for the convenience of its employees.

The full number of shares subscribed for by an employee remains with the company for a period of 5 years whether the stock has been previously paid for or not. If all payments have been made and the stock is fully paid up, it is then delivered to the owner. Otherwise it remains with the company until the amount due is completed.

Cancellations are made upon any of the following conditions:

a—Request of the employee.

b—Failure to make payments when due unless time is extended by the employees' stock department.

c—Any attempt of the purchaser to sell his stock, his agreement or any rights thereunder.

d—Resignation or dismissal of the employee prior to the expiration of 5 years, excepting women who have been in the employ of the company 2 years or more and who leave the employ to be married within 3 months and who, when married, have the privilege of continuing their payments on the same terms as if they remained in the company's employ.

In the event of cancellation or any agreement, the employee receives the full amount of all payments with interest at 6 per cent from the date upon which each payment has been made. An additional sum will also be paid provided the market price of the stock is in excess of the price at which the worker purchased it upon the following schedule:

Cancellation in less than 1 year—No additional payment.

Cancellation at 1 year and less than 2 years—10 per cent of the difference between the price at which the employee purchased the stock and the market price.

Cancellation at 2 years and less than 3 years—25 per cent of the difference between the price at which the employee purchased the stock and the market price.

Cancellation at 3 years and less than 4 years—45 per cent of the difference between the price at which the employee purchased the stock and the market price.

Cancellation at 4 years or thereafter—70 per cent of the difference between the price at which the employee purchased the stock and the market price.

The market price is secured by taking the average bid price as quoted in two leading Cleveland morning papers on the Tuesday preceding the date of cancellation. If a more reliable source becomes available, the company reserves the right to adopt it, and also reserves the right to sell the stock of the employee in the open market and to pay the worker the percentage as scheduled above instead of directly taking over the stock.

All stock taken over is to be turned back to the employees' stock department to be thereafter resold to workers at the average cost to the company.

In the event of death or total disability, while his stock agreement is in force, the employee or his or her beneficiary or his or her estate shall have the privilege of continuing payments on the stock purchase agreement on the same terms and conditions as if the worker were still in the company's employ, or if the employee or beneficiary or estate does not elect to take advantage of this privilege the company will either purchase or sell the stock at market price and pay the full price realized less any indebtedness due on the agreement, to the employee or beneficiary or estate.

Holding the Workers

Immediately this plan was evolved, blanks were issued informing each worker how many shares he was entitled to purchase and requesting him to state the number he wanted. Returns were large. Practically every worker made a demand for the maximum shares. Many men are paying cash in full and are anxiously awaiting the time when they can buy more stock. And again, the company has created a plan whereby the men will keep their jobs, for no worker is desirous of losing the valuable returns to be derived from the stock—and in addition, he becomes a more thorough worker, since he feels a proprietary interest in the company. Of course, the plan costs Firestone approximately $40 for every share taken by the employees, but the estimates of the cost of labor turnover make this a negligible amount in consideration of the returns.

A number of companies have endeavored to determine just what labor turnover costs. One concern employing 18,000 men which is forced to employ 88,000 in the course of the year to maintain its organization, estimates that the minimum cost per man is $64, which means that that company is paying something like $4,000,000 yearly because of the labor turnover evil. Another employer with a force of 4000 men believes that his labor turnover which is 20 per cent a month costs him between $75 and $500 per man per year, dependent on the individual. These figures are based upon the cost of the huge employment force it is necessary to maintain, the cost of time and space used by the employment department, the cost of examination and investigation, the cost of instruction, the cost of hindered production, the cost of damage to machinery, the cost of defect of product and the cost of the constant discord wrought in each department by the hordes of men who come and go.

Clubhouse Pays for Itself

The clubhouse erected by the company at the expense of $350,000, and which was described in a previous issue of THE AUTOMOBILE, is as yet more or less of an experiment and the company is, in consequence, unable to determine the results and the cost.

The institution is sustained by members who pay $2 yearly dues and by the returns from the barber shop, bowling alley, swimming pool and lunchrooms, plus appropriations from the company's treasury. After 3 months' operation there are 2000 members who pay 5 cents a game for bowling, 5 cents for the plunge, which includes suit, towels and soap, 10 cents for a shave and 25 cents for each meal. The cigar stand sells cigars and tobacco at a profit of 10 per cent. The meal costing 25 cents is sold at actual cost and is equal to a meal costing 80 cents at a downtown hotel. At present the club requires an outlay of $250,000 yearly, the majority of which is spent for food, as more than 3000 meals are sold daily. It is now estimated that the clubhouse will cost the company about $500 a month over the receipts, based on the existing membership, which will probably double itself within the next year.

The company, however, is using the dining rooms to hold its banquets. These cost less than $1 a plate as compared with $3 a plate at downtown hotels. In consequence, it is apparent that, taking all factors into consideration, at the ex-

piration of 12 months, the clubhouse about pays for itself.

Mr. Lee is now planning to utilize a part of the $1,000,000 voted for welfare work, for a comprehensive group insurance scheme whereby workers will receive life insurance. Details of the plan will not be completed for several months.

These form, in the main, Firestone plans, for the creation of contented employees and the reduction of labor turnover, but it has also engaged in many minor deeds embodying the same ideals and practicability.

Office Men Form Club

Recently twenty members of the office force discovered a vacant mansion in Akron with sixteen large and comfortable rooms and 2½ acres of ground, that could be rented for $100 a month. The group held a conference with the company officials. The house was rented. The company provided $2,000 to pay for furnishings. The men employed as housekeeper a woman who had been in charge of the small Firestone restaurant, previous to the construction of the clubhouse, and a man to act as a general worker. To-day those twenty young men paying $30 a month each, secure good meals, have excellent living quarters, and by their joint expenditure pay the necessary salaries, rent and all other upkeep. Talk to one of them about their "Valley View Club" home or about the Firestone company and they speak as if they were discussing their own homes or fathers.

In fact, the entire organization, with its smiles, contentment and cheerfulness, its light and sanitary shops and offices, its own homes, its clubhouse, and its common stock interest in the concern, regards the company and its officials far more as a huge family rather than as an industry. And it pays. Of that there is no doubt. The results display themselves in the following figures which show just how three companies in Akron fared during the busiest months of 1916 when each was striving to add to its organization.

	A Company	B Company	Firestone
July	13,028	12,310	4400
September	13,021	12,338	6610

Thus while A lost seven men despite efforts to increase, and B added but twenty-eight men, Firestone increased by 2210 men.

There is much in the Firestone system worthy of adoption.

Magnalite and Magnalium

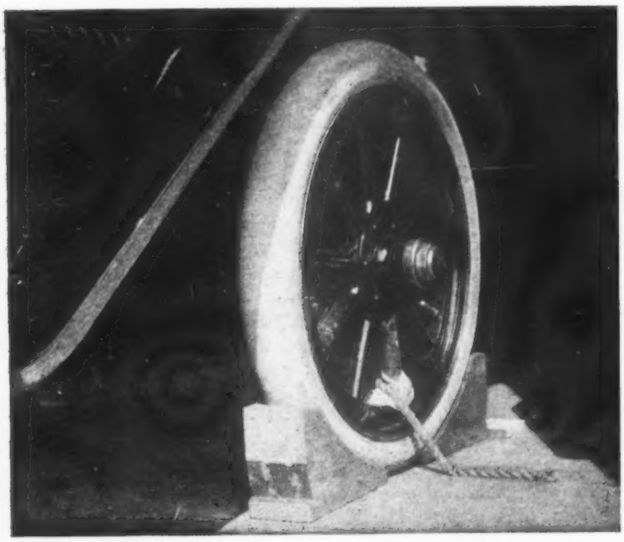
THERE is no *Magnalium* at present on the American market, and when aluminum alloy pistons are described as *Magnalium* pistons they are usually *Magnalite*. The Walker M. Levett Co., New York City, before the war made *Magnalium* articles from a German alloy of this name. Since the supply of this alloy was cut off they have developed an alloy of their own known as *Magnalite*, and it is from this, they state, that the various pistons described as *Magnalium* have been manufactured.

Comparative Strength of Shipping Strap Materials

Advantage Rests with Hemp Rope for Securing Automobiles in Freight Cars

IN THE AUTOMOBILE for April 13, 1916, appeared an article describing the different sorts of loading blocks used to position automobiles while being carried by rail and it was shown therein that the Evans block which is curved to fit the tire has the great advantage of holding the car sideways as well as fore and aft, thereby eliminating the side boards necessary with blocks having flat faces.

Since that time E. S. Evans, the inventor of the Evans block, has been experimenting with the different ways of tying down the wheel after it is between the blocks and he states that the quality of the tie is almost as important as that of the block. The strap is necessary to prevent chafing and to avoid any danger of the car rolling out of the blocks if the train receives a sudden jar.



Evans shipping block in use. Note rope tie

The material most commonly used for straps is burlap or common duck sewed into strips about 4 in. wide and usually four-ply. Where straight faced blocks are used it is possible only to use flat straps of this character as a rope would make it difficult to use side strips, and side strips are necessary with straight faced blocks.

The following tables will give some idea of the comparative strengths of the several materials used. On account of the inherent weakness of the flat straps, the railroads are deluged with claims for automobiles injured en route:

TIE STRAP MATERIALS

Material	Ply	Weight, Oz.	Width, In.	Test Load, Lbs.	Elastic Limit, In. Per Ft.
Burlap	4	8	3 1/4	310	3/16
Burlap	4	10	3 1/3	From 585 to 1020	1/4
Burlap	4	12	3 1/3	From 685 to 1210	5/16
Burlap	4	14	4	854	1/8
Burlap	6	14	4	1251	3/32
Osnaburg	4	7	3 3/4	910	...
Osnaburg	4	8	3 3/4	1020	...
Osnaburg	6	7	3 3/4	1365	5/8
Osnaburg	8	7	3 3/4	1900	...
Single	4	8	3 3/4	1390	...
Filling	4	10	3 3/4	1440	...
Duck	4	12	3 3/4	1790	...
Duck	4	14	3 3/4	1900	...
Belting	1	30	4	960	7/16

ROPE

Diameter, In.	Length Per Lb.	Test Load, Lb.
5/8	7 ft. 6 in.	3000
3/4	6 ft. 1 in.	3900
13/16	5 ft. 1 in.	4700
7/8	4 ft. 5 in.	5700
1	3 ft. 8 in.	6750

The loading system claimed by Mr. Evans to practically eliminate railroad claims consists of the Evans block and the hemp rope as illustrated.

Foreign Trade Department

Take-It-or-Leave-It Arguments of Salesmen Are Injuring Us in Australia—Possibility of Prohibiting Importation of Luxuries

"BUT it can be definitely stated that America will lose her grip on Australia immediately she has to face competition. The reason for this assertion is that American manufacturers and export agents have in some cases failed to deliver goods equal to sample, while in one section of trade at least the contract has not been observed. In the present state of American affluence, too, the take-it-or-leave-it attitude may have been thoroughly successful, whereas it will be a serious difficulty for the American traveler to overcome when he calls in more peaceful times."

This is how *The Argus*, of Melbourne, Australia, under date of Jan. 6, 1917, sizes up the present invasion of Australia by our manufacturers. This statement does not apply solely to the automobile industry, but as the automobile industry is referred to particularly in another part of the article the opening criticism applies as much to the automobile industry as to any other.

A Serious Situation

The most serious aspect of this criticism is the take-it-or-leave-it attitude of our travelers who have reached Australia. This is serious. It is equally serious at home. Last week a large Eastern manufacturer told of a machinery salesman who called on him and suggested that while he was not looking for immediate orders he could book orders for 15 or 18 months delivery. The attitude of the salesman was such as to arouse the prospective buyer, who fortunately had a good opportunity of getting a strangle hold on the traveler. The traveler quoted 25 per cent premium on machinery on 15 months delivery, but the buyer had purchased the same machines at $60 below the regular price and had options on others at the same figure. The salesman was quite taken off his feet when shown the proof of this and his entire attitude changed.

With this situation occurring at home and creating the unfavorable opinion it does, it is easy to judge how it grates on the Australian buyer, who, with his British inclinations and British patriotism, naturally dislikes seeing his mother country lose its foreign trade.

We quote further from *The Argus* of Melbourne, the following applying especially with regard to the automobile and accessory industry:

"One of the features of American trade conquests is the motor car. As soon as the British and Continental factories were confined to war work, the American motor car maker literally flooded Australia. The better classes of American cars were soon to be seen in large numbers, while the car which was sold on its price had come in shiploads. Thus in the year ending June 30, 1916, there were $5,000,000 worth of cars and cycles brought into Australia. The aggregate is about two-and-one-half times the normal figure. Of motorcycles the figures show $525,000 worth as compared with $30,000 worth for the calendar year of 1913. Of motor bodies and chassis the combined value was $4,980,000 as against $2,150,000. As a result there are plenty of cars to be bought in Australia to-day, agents of some makes at least having heavy stocks.

"Of rubber manufactures, principally tires, the imports amounted to $2,446,000, against $480,000 in 1913, or against $630,000 for the 1914 season."

The very heavy importation of American automobile tires into Australia during the past year has resulted in our skating on thin ice so far as holding the Australian trade is concerned. Another Australian paper, the *Herald* of Sydney, under date of Jan. 12, 1917, touched on this situation as follows:

"The alarming increase in the importation of rubber goods, principally motor tires, has drawn the attention of labor interests. The importation of rubber goods in 1914 amounted to $4,500,000; in 1915 to $3,500,000; and in 1916 to $6,580,000. The rubber industry in Australia ordinarily employed 2000 hands, but owing to the heavy imports from America a large number of rubber workers are out of employment. There were no fewer than 600 of these in Melbourne alone. . . . The present duty on tires is 12 cents per pound, but labor interests here believe that there should be a 50 per cent increase against American tires. Labor representatives suggested that the Federal government be written urging a prohibitive duty on rubber goods or failing in that, that the importation of rubber goods be prohibited under the War Precautions Act; that the importation of automobiles with tires fitted be prohibited; that protests be made against the action of the Postmaster General in adopting the American standard mileage guarantee, thereby assisting the Americans to force up the price of tires and form a trust to fix the selling price of tires; and that a deputation wait on the government to request that American cars at present owned by the government having straight side rims be immediately fitted with clincher types of rims."

Tact and Diplomacy Needed

There is a strong feeling gaining ground throughout Australia that the Australian government should put some prohibition on spending the "last shilling" in buying American luxuries. The purchasing of $5,000,000 of motor cars and motorcycles; $200,000 of gramophones; $650,000 of pianos; $230,000 of cameras; $360,000 of clocks; $320,000 of perfumery; and $625,000 worth of silk stockings in one year is not looked upon favorably by quite a percentage of the population in Australia. This situation suggests how necessary it is to handle our foreign trade in Australia with silk gloves rather than with steel knuckles. These are days when we should be making friends in our foreign trade; and it is suicide in export trade to adopt the take-it-or-leave-it attitude, solely because our competitors are temporarily out of the market.

These are days when we should be sending our strongest foreign trade representatives into the Australian market. We should have our men who are competent to correctly estimate all the business pulses of the country. It will not do to wait until the Australian government passes some measures prohibiting importation of our motor cars or motor tires. Our business is not only to hold the existing trade but increase it, and extending every courtesy to give the Australian what he

wants is the best method of reaching that end. We cannot reach it by the take-it-or-leave-it route.

Of late Australian newspapers have been very pronounced in their remarks toward trade competition from America. The two papers quoted are the most conservative in Australia, and in the past have not said much about American trade which is now so popular in Australia. Australian papers have advocated the abolition of all kinds of luxuries and when a country is seriously considering such it is no time to wave the take-it-or-leave-it argument.

There is a strong desire to turn Australia with its population of 5,000,000 into a manufacturing country and later taking a strong position in the export field.

In January at a meeting of the Motor Traders Association in one of the countries in Australia some of the members were alarmed at the extent to which American cars are being sold and it was thought best to reduce motor car advertising to a very modern and conservative tone and not to unduly advertise the matter throughout the country. Because of this American trade representatives in Australia should not be too glaringly aggressive on pushing American trade. It is this glaring aggressiveness that has brought forth so many articles from the papers. These are days when boasting should be left out of the foreign trade alphabet. These are days when the take-it-or-leave-it letters should be dropped from the foreign trade alphabet. These are days when business courtesy should take a stronger position in foreign trade than ever before.

France Opens First State Agricultural Motor School

American Tractors Largely Used—320-Acre Farm Near Paris Donated—Commercial Use of Aeroplanes Under Study

PARIS, Feb. 10—The first State agricultural motor school has just been established on a 320-acre farm near Paris, given for that purpose by Madame Gomel-Pujos. The school, which is under the direct control of and maintained by the French government, aims at forming specialists who can handle and care for agricultural motor machinery, and particularly agricultural tractors. Only Frenchmen and foreigners of allied nations are allowed to enter the school either as pupils or masters.

Private agricultural motor schools have been established at Chartres and Le Mans and are particularly interested in giving a special training to men wounded in the war, so as to make them capable agricultural-mechanics. Vigorous efforts are being made at the present time to extend the use of motor tractors in all the agricultural districts of France, in order to meet the food shortage caused by lack of labor. It is estimated that 400 to 500 tractors are now in service, and a generally accepted estimate is that 30,000 to 40,000 might be used to advantage at an early date. The only tractors now available are those of American origin, and these are being bought readily. Agricultural interests are concerned in getting French tractors on the market, but there is no possibility of doing this until after the war. There is every indication that the future fuel for agricultural tractors will be denaturized alcohol. Gasoline and kerosene have both to be imported and are costly. The quantity of industrial alcohol now used by the military in making explosives is estimated at 1,750,000 gal. per day. Most of this will be available for agricultural purposes after the war, and if the French colonies are interested the amount could be increased to an almost unlimited degree. The government has promised to place industrial alcohol on the market, after the war, at very cheap rates, and has prepared all the legislative machinery necessary for doing this.

Motor trucks undoubtedly saved the lives of hundreds of Parisians who during the recent severe weather were without coal and unable to secure further supplies. All the coal dealers' stocks had become exhausted, owing to the stoppage of supplies up the river Seine, and the only coal available was in the reserve depots of the city of Paris. It was impossible, however, to distribute it to the various quarters of the city and suburbs, owing to the absence of men and horses. It was at this critical point that the military authorities decided to place 1800 army trucks, about half of them being American-made, at the disposal of the city for the haulage of coal to local dealers. Crowds awaited these supplies and snapped up the stock as soon as it was dumped from the automobiles.

Study Commercial Use of Aeroplanes

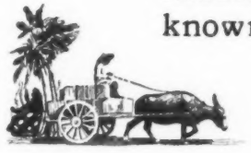
A government commission has been formed in France to study the question of the commercial use of aeroplanes after the war. Since 1914 an immense industry has been built up to supply aeroplanes to the army, and the automobile and other engineering factories are producing aeroplane engines in enormous quantities. Series of several thousands have been placed for one make alone, and there is hardly an automobile factory in France which is not in one way or another interested in aeroplane engines. Obviously this huge industry must be provided for when peace conditions are restored, and the object of the commission is to find means of establishing air services for mails and passengers in France and between Allied countries.

White army truck carrying coal from reserve depot in Paris to retailers unable to secure supplies

Philippine Islands Are Fertile Field

Part III

Modern Sales Methods Are Unknown—U.S.A. Makers' Problems



By Percy Warner Tinan

EDITOR'S NOTE:—This is the third and concluding installment of a special serial article on the Philippine Islands as an export field for the U. S. A. manufacturer. The author, Percy Warner Tinan, has been connected with the automobile industry in the islands for 6 years, first with the Manila Times and Philippine Free Press, then 3 years as sales and advertising manager of the largest automobile house in the Far East; and as owner and publisher of Philippine Motor Topics, road guides and directories.

THERE isn't a Filipino automobile dealer in the islands, but this is not to be expected when the native's lack of commercial ability is considered. Of the present Manila dealers, and they constitute the dealers of the islands, three are Americans, two are French and one is English. They do not know the meaning of a modern sales organization as it is known in the U. S. A., not that it would not apply to the Philippines, but they have had good business without much effort. Very little effort is made to secure customers as is done in New York, Chicago or anywhere else in U. S. A. Most Philippine dealers wait until the customer comes to the salesroom. It is for this reason that live dealers with capital and aggressive ideas could step into the field and make good. While Spanish is a great help it is not a necessity. It is doubtful if there is a Manila dealer to-day who has a list of prospects which he is systematically working. Some of them will tell you that such a system is of no use, but the writer can state most emphatically that American salesmanship as practised at home will apply in a great measure to the Philippine Islands. The attitude of some of the Manila dealers is best illustrated by citing a remark made by the manager of one firm to his sales manager, viz.:

"You had better stay inside and watch things here. No need to go chasing around after car buyers. People know us and when they decide to get cars they'll come around."

Headquarters in Manila

The ideal automobile establishment in the Philippines should have its headquarters in Manila, with an attractive salesroom in an accessible locality. There is no reason why a typical American salesroom of the better class, not necessarily elaborate, would not make a great hit in Manila. Active subagencies should be established in Cebu, Iloilo, Zamboanga, and possibly in Lucena or San Pablo in the copra-producing provinces. Responsible business men in several smaller cities and towns should be induced to purchase cars and act as sub-dealers to the best of their ability, although their fields would be smaller than those of regular sub-dealers. There is really no sub-dealer organization in the Philippine Islands, but to cover them properly at least three or four sub-dealers. They would be located in Vigan (Vee-gan), San Fernando, Cabanatuan (Ka-bana-tó-uan), San Miguel (Ma Gill), de Mayumo (My-you-mo), Batangas, Naga (Nah-gah), Legaspi, and Tacloban (Tac-lo-ban). The Manila headquarters should arrange to have their cars arrive in regular monthly shipments and this can only be done by making arrangements with the factories and contracting for steamer space through one of the forwarding concerns in this country. At least five cars of each make handled should be carried in stock at headquarters at all times, and from one to three at the sub-agencies. While some Filipinos think over the car purchase for weeks before buying the majority make up their mind over night and they often buy on the recommendation of some "amigo," (friend,) or relative.

Honesty and sincerity count with the Filipino and he must have "mucho confianza," (Moo-cho kon-fe-an-zah, or great confidence,) in the dealer. It is this confidence which the Filipino has in Manila's largest dealer that has enabled the house to do almost 50 per cent of the local business.

Makers' and Dealers' Duties

The manufacturer should not expect to make a clean-up out of his Philippine business in the first 2 years and for this reason should do his share in a generous advertising appropriation, not less than $10 per car, speaking of the $1,000 class, which would be met by the dealer. A generous supply of literature, plenty of newspaper publicity, and above all cuts and Spanish catalogs should be forwarded at frequent intervals. A car should not be sent out without a parts list and instruction book as a part of the tool kit. Private cable codes are also of great value to the dealer who is forced to add so much to every car to cover the enormous cost of a year's cable charges. Tools should be securely packed in a wooden box and sealed, with a packing list in envelope nailed to outside of box. The dealer should never open this box or envelope until car is sold. And above all things the manufacturer should not put the office boy in charge of his export department while he turns his best efforts to domestic business. This statement is made by the writer after years of experience in facing the most absurd situations resulting from outrageous neglect on the part of the manufacturer. In fact, no part of the manufacturer's organization should be more "on the job" than the export department, and this department should be handled direct from the factory and not through some export house, unless the exporter offers some exceptionally good inducements that will work out to the financial benefit of the dealer, which is very unusual.

Spare Parts Are Important

The question of spare parts is a serious one for manufacturer and dealer alike. Without a complete stock of spare parts the dealer will find the native's confidence gradually diminishing and the manufacturer, who has refused to aid the dealer in any way, will witness a rapid decrease in his sales. Let it be said for the average Manila dealer that he maintains a good supply of spare parts and at no small expense for he rarely asks the manufacturer for parts on consignment. In one firm the stock runs close to $50,000, and there is an annual loss from this department. One dealer, however, agent for the manufacturer of one of our highest

grade trucks, has always carried a slim stock of spare parts and although the manufacturers heard of numerous complaints he allowed the matter to slide until finally a certain government engineer came out with a long article claiming that big trucks were of no use in certain fields as they were laid up for too long periods due to lack of spare parts, complaining in one case of the lack of such a common thing as a drive chain. This truck on one occasion was out of service for 3 months due to lack of spare parts. If the dealer cannot, or will not, carry sufficient spares it is up to the manufacturer to consign them on a monthly settlement basis and at possibly a less discount than given for outright purchases.

Service Could Be Improved

Manila service is not what it ought to be. Systematic service as planned and arranged for by some of our prominent manufacturers is a much-missed stranger. Instead the Manila dealer "guarantees" the car for a year and no one knows what this guarantee covers. He gets himself into a peck of trouble and expense and offers as an excuse that he had to do it some years ago in order to get the native to buy a car. Now he hasn't the nerve to stop it and introduce the only real argument that service does not mean something for nothing but "what an owner wants, when he wants it and in the way he wants it, and at a reasonable charge." And owing to a lack of good mechanics, shop room, organization or system it is hard to find a garage in Manila to-day where one may leave a car with any degree of confidence. There is a hapless lack of competency in repair work. There are too many apprentices and not enough supervision of work.

Right here is an opening for some wide-awake dealer to make good in a hurry. One Manila dealer selling a low-priced four and a medium-priced six has no shop at all and a bushel basket would almost hold his stock of spare parts. He sends his customers to an outside shop the sight of which would be enough to keep out any sensible owner. Manila's largest dealer maintains a shop to care for customers only but it lacks room, daylight, system and organization.

The manufacturer who is doing, or would do, any volume of business in the islands should keep a service man in Manila as a headquarters for covering most of the Far East. The Studebaker Corp. is the only maker doing this at present. It maintains a competent U. S. A. service man in Manila who covers the Far East. Studebaker is now enjoying excellent sales.

Manila has about twenty garages where cars are for hire from $1.50 U. S. A. gold per hour up. In fact, fully 22 per cent of the automobiles in the islands bear numbers preceded by the letter H, meaning that they are for hire. There are several stands on the streets of Manila and some of the other cities where cars may be rented at $1 and $1.25 per hour. Cebu and Iloilo have three or four garages each. Zamboanga has three and the other cities mentioned from one to three.

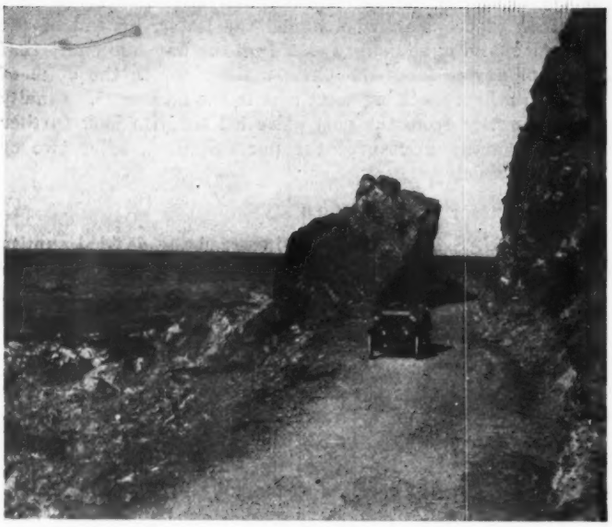
How do these cars that rent for $1.25 an hour make money, you ask?

Garage Business a Cut-Throat Affair

They don't nor do those at $1.50 per hour, except in the case of one garage that is exceptionally well managed. The garage business in the Philippines is the worst cut-throat game in the Far East. Most dealers make money out of them as they usually get paid for the cars and the public gets some cheap transportation, but as fast as one deluded car owner drops out with a wreck on his hands another steps in. There are three excellent garages in Manila where residents and tourists may get the best of service. One operates eight Renaults, eight Dodges and six Fords.

The rates for these cars are, per hour, Ford, $1.50; Dodge, $2; Hudson $2.50, and Renaults, $3, $4 and $5 including native driver. The third operates Fords and two Stearns-Knights and is a model of cleanliness, good service and low rates. Five years ago garages were springing up over

Two views in the salesroom of one of Manila's leading dealers, the Estrella Auto Palace. These illustrations are from photographs taken in 1913, when the smaller stock carried allowed a better salesroom display. This room is frequently crowded with from twenty to twenty-five cars



Where the Manila north road follows the coast of the China Sea for many miles in the provinces of Ilocos Sud and Ilocos Norte. Some of these spots rival those of Italy and Southern France for scenic beauty

night, and going out of business almost as quickly. Then came a period of the survival of the fittest, but a flood of cheap cars on the Manila market started price cutting again, and this in the face of unheard-of prices for gasoline and tires.

Gasoline Averages 50 Cents per Gallon

The normal price of gasoline in Manila is about 37 cents a gallon but since the war started it has averaged 50 cents and has gone as high as 55, with prices running to 60 in some parts of the provinces.

Tires cost 20 to 30 per cent more than they do here and except in the case of some of the new cord tires, 3500 is the average mileage in the Philippines. European tires are not sold on a guarantee basis, but a few U. S. A. makes are. The guarantee is not a necessity. Tires represented in the Philippines are Michelin, United States, Goodyear, Goodrich, Fisk, Firestone, Congress, Kelly-Springfield and Pennsylvania. The Goodyear cord tire has been gaining rapidly in the last few months. Michelin had the field to itself until a few years ago. Non-skids are in great demand.

Curb Pump Stations Established

There are three different brands of gasoline, Pratt's Motor Spirits, handled by the Standard Oil Co.; Texaco, by the Texas Co., and Shell Motor Spirits, by the Asiatic Petroleum Co. The last named comes from Sumatra. Practically all gasoline is imported in the usual export case containing two 5-gal. cans, although there are three new curb pump filling stations in Manila which are supplied from 52-gal. steel drums. These pump stations were established within the past year. Each of the three agencies sells to numerous dealers in Manila and through the provinces and sees that the price is kept the same for all three brands. Shell gasoline has only to be transported from the company's base in Sumatra or Singapore, 5 days by boat, while Pratt's and Texaco have to pay the enormous war freight rates from the U. S. A., at one time recently as high as $2.50 per case, yet Shell commands the same price as its two competitors.

Vacuum Mobiloil "A" sells for from $1.15 to $1.25 per gallon can, depending upon locality. This brand is the largest seller.

The Philippines offer a good market for nearly everything in accessories, bumpers, clocks and radiator ornaments standing well up in the line, with folding tonneau chairs, lamp bulbs, spark plugs, pliers and pumps also in good demand. Manufacturers would do well to communicate direct with dealers instead of waiting for the dealer to buy through a jobber. Spanish catalogs are unnecessary and Spanish literature is of little use, except light folders or envelope inserts which are needed to more completely describe some accessory of particular merit.

Carelessness in Addressing Spanish Circulars

The writer has seen the indiscriminate mailing of hundreds of Spanish circulars to Philippine automobile owners where the addresses clearly indicated that the addressees were not Spanish. But unless these circulars, even when properly mailed, bear the imprint of some Manila dealer they might as well be thrown into the ocean before they ever get aboard the steamer.

The old story of the American manufacturer's lack of knowledge of export business and disinclination to learn never was more evident than in the automobile business. This article does not afford space to cite the many amusing as well as serious blunders at this end. One Manila dealer's first experience with a U. S. A. manufacturer was the receipt of a cable in which the latter asked for $35 more to complete a credit which was supposedly opened in full to cover a purchase of six cars! It cost the Manila dealer about $20 to cable the $35.

Some months ago a U. S. A. headlight deflector maker received a letter order for a sample lot of ten deflectors. The maker drew on the Manila house and all was entirely satisfactory except that the goods naturally arrived without the consular invoice, the consignee therefore being required to put up a bond to produce invoice. But that was nothing to what followed. The samples worked out and a cable was dispatched for an additional 500. The cable was of course signed, but after 13 days the cable company reported that it had been refused by addressee, as the sender was unknown!

Dealer Charged with Cable Expense

It is nothing uncommon for a Manila dealer to receive cable advices from a U. S. A. factory that cars are on a certain steamer, this cable leaving the U. S. A. sometimes as late as 10 days after the ship has sailed. The dealer makes agreements to deliver, often has government orders on hand, and his custom house men come back from the steamer to report that there are no cars! It is easy enough to cable that cars will leave on a certain steamer and then have them lie on the dock, but to make such a blunder after a steamer has sailed without cars is unpardonable in modern business.

Manila dealers have been confronted by customers with copies of U. S. A. magazines containing announcements of new models that they had not even heard of by catalog or letter advice! The manufacturer wanted to be so close with information on his new model that he forgot that from 3 to 5 weeks are necessary for mail to reach Manila and that the dealer there is put in a very embarrassing position. One U. S. A. concern compels its Manila dealer to stand most of the cable expense. They have been doing business for the past 6 years and in this time the address and signature have been taking three words. About 6 months ago the factory cabled the dealer about a matter for which the dealer had to pay cable charges and the address and signature took twelve words at $1.09 per!

In November, 1915, a Manila dealer placed an order for a complete engine for an army truck, same to be shipped by next army transport, rush, in December, or January at the latest. In October last this engine was yet to be heard from, and this manufacturer was supposed to be making a bid for army trade.

A Cleveland manufacturer made shipment of a lot of touring cars so poorly packed that the Philippine Islands dealer was forced to make a reduction on each before he could dis-

pose of them. In another instance a Detroit factory made shipment of twenty-four cars on flat cars to the coast in the winter, booked for Manila, and when they were unpacked 2 months later water ran out of the tops. The paint on every car was ruined and the upholstery badly damaged on many.

Last year a certain car that had always enjoyed the greatest popularity in the Philippine Islands developed into a gasoline eater. The factory was written post-haste and replied that it was sending out something to change the carbureter adjustment. Some inefficient clerk handled the matter and the factory lost 3 months' sales before the dealer finally got busy and remedied the matter provisionally. Then, after more correspondence, the necessary parts arrived.

A certain very low-priced car that is enjoying deserved popularity in the U. S. A. and which would have had a big sale in the Philippine Islands was absolutely killed about a year ago through the inability of the agents to give the proper service, probably through a lack of understanding of the fundamental trouble, a little faulty design in that it required more attention than the ordinary owner would give it. Had the manufacturer seen fit to have cautioned the dealer regarding the little fault, which was mostly lubricating trouble, his car might to-day be enjoying a good sale, for the Philippines are clamoring for good, cheap cars. The agency for the car was later offered to a strong house in Manila, who turned it down cold, not knowing what the trouble had been other than the fact that the original dealer had been obliged to take back some of the cars and that all owners were dissatisfied.

An Opportunity Rejected

The builders of one of America's highest grade trucks had the opportunity 4 years ago of placing his agency with the strongest house in Manila, but because these people handled two prominent French trucks the U. S. A. manufacturer declined in a short and curt letter. This firm finally placed its agency with another Manila dealer handling an American truck which was in direct competition. The business resulting amounted to two truck sales and, after 2 or 3 years have been wasted, the manufacturer has placed his agency with a local importer who has never made a success of his automobile ventures. The moral in this story is that American manufacturers should look to the strength and influence of the Philippine importer and it will often be to the former's advantage to place his agency, even against competing lines.

A few months ago a Manila dealer wrote to a manufacturer asking for certain parts. The manufacturer referred this inquiry to the companies making them, but in so doing gave the name of the man who signed the letter, instead of the firm name, and in so doing twisted up the name so badly that letters of advice from the parts makers lay in the office of the Manila firm awaiting some clue to the addressee. Finally a parcel notice from the post office led them to look further and they finally discovered the parts wanted, after two or three weeks' delay.

Advertised Over Dealer's Head

Another U. S. A. factory has incurred the decided enmity of its Manila agent by placing advertising direct with a Manila publication, over the dealer's head, and this after the dealer had had an unequalled success with the car. This is a practise which American manufacturers should not follow. The advertising usually costs them more, is often placed at the wrong time of year and copy is sometimes unsuitable, especially if in Spanish translated in this country by non-technical men.

In shipping parts and accessories, each box should be numbered, a packing list inclosed and a copy forwarded with invoices. Invoices, of which there should be at least four copies, should show the contents of each case, and should bear in addition the necessary customs declaration necessary for all American goods going to the Philippines. A rubber stamp should be made for this, thus saving the time necessary for typewriting and minimizing the chance of its being missing on the invoice. Failure to show consular declaration causes delay and production of a bond in Manila. Shippers should remember that the overland route and steamer from San Francisco or Seattle is always quicker than direct steamer from New York and costs no more.

Repairing Tires from the Outside

THE question is often asked in tire repair work, "Why not tear down sections on the inside of the tire?" Here are the most important reasons briefly stated.

Dirt and water penetrate a tire from the outside. Many a repairman working from the inside has had trouble due to not cleaning up the dirtiest part of the injury, just under the tread or side wall.

It is much easier to do thorough work in replacing the plies on the outside and the repair is always much stronger and more durable.—D. R. Cain, Instructor School of Tire Repairing, Goodyear Tire & Rubber Co., Akron, Ohio.

This picture illustrates a part of what is now the largest and most completely equipped building occupied by any automobile dealer in the Far East. Since the photograph was taken the building has been extended to double the size and includes two handsome adjoining salesrooms, mezzanine floor offices, battery service station, vulcanizing plant, upholstering and body building department, paint shop and completely equipped machine shop. It occupies a full block. One half of the second floor is devoted to storage space for trucks and surplus touring cars. The two large double doors in the left half of the picture are the entrance and exit to the storage and rental room, where fifty cars can be accommodated. The building is the plant of the Bachrach Garage & Taxicab Co., White, Overland, Saxon and Minerva agents

Automobile Calendar

CONTESTS

1917

April—Los Angeles to Salt Lake City Road Race.
May 19—New York Metropolitan Race on Sheepshead Bay Speedway.
May 30—Indianapolis Speedway Race, Championship.
June 9—Chicago, Ill., Speedway Race, Championship.
June 23 — Cincinnati, Ohio, Speedway Race.
July 4—Omaha, Neb., Speedway Race, Championship.
July 4—Tacoma, Wash., Speedway Race, Championship.
July 14 — Des Moines, Iowa, Speedway Race, Championship.
Aug. 4—Kansas City Speedway Race.
Sept. 3—Cincinnati, Ohio, Speedway Race, Championship.
Sept. 15 — Providence, R. I., Speedway Race, Championship.
Sept. 29—New York, Speedway Race, Championship.
Oct. 6—Kansas City Speedway Race.
Oct. 13 — Chicago, Speedway Race.
Oct. 27—New York Speedway Race.

SHOWS

March 3-10 — Boston, Mass., Show, Mechanics' Bldg., Boston Automobile Dealers' Assn.
March 3-10—Washington, D. C., Middle Atlantic Motor Assn., Inc., Union Bldg.
March 5-10 — Brooklyn, Truck Show, 23rd Regiment Armory.
March 5-10—Jamestown, N. Y., Jamestown Automobile Dealers' Assn., Armory. C. A. Hanvey, Mgr.
March 5-12—Birmingham, Ala., Auditorium.
March 6-9—Fargo, N. D. A. Hanson, Mgr.
March 6-10—Fort Dodge, Iowa, Northern Iowa Show, New Terminal Warehouse, G. W. Tremain, Secretary.
March 7-10 — St. Joseph, Mo., Auditorium, St. Joseph Automobile Show Assn.
March 10-17—Zanesville, Ohio, Muskegon Motor Club.
March 12-14—Fort Worth, Tex., Fat Stock Show, Coliseum.
March 12-17—Vancouver, B. C., British Columbia Automobile Assn., Horse Show Bldg.
March 13-16 — Fargo, N. D., Armory and Auditorium.
March 14-17—Mason City, Ia., Armory, Mason City Automobile Dealers.
March 14-17—Davenport, Iowa, Show, Coliseum Bldg., Tri-City Auto. Trade.
March 17-21—Manitowoc, Wis., F. C. Borcherdt, Jr., Mgr.
March 17 - 22 — New Haven, Conn., Show, Hotel Taft.
March 17-24 — Pittsburgh, Pa., Motor Square Garden. J. J. Bell, Mgr. Automobile Dealers' Assn. of Pittsburgh.
March 18—Lyons, France, Fair.
March 18-23—Cedar Rapids, Ia., Cedar Rapids Automobile Trades Assn.
March 19—Paterson, N. J., Sixth Annual, Auditorium. R. A. Mitchell, Mgr.
March 20-25—Denver, Col., Mammoth Rink, H. F. Blackwell, Promoter.
March 21—Trenton, N. J., Second Regiment Armory. J. L. Brock, Mgr.
March 27-31—Deadwood, S. D., Fifth Annual, Deadwood Auto Show. J. E. Nelson, Mgr.
March 31-Apr. 14—Atlantic City, Garden Pier. S. W. Megill, Mgr.
April—Milwaukee, Wis., Spring Show, Milwaukee Automobile Dealers.
April—Calumet, Mich., Show, Coliseum. Frank Ketchell, Mgr.
April 4-7—Stockton, Cal., Second Annual San Joaquin Auto Trades Assn. Samuel S. Cohn, Mgr.
Sept. 2-9—Spokane, Wash., Interstate Fair.
Sept. 9-15 — Milwaukee Show, State Park Fair, West Allis.
Sept. 9-15 — Milwaukee, Wis., Fall Show, Wisconsin State Fair, West Allis, Milwaukee Automobile Dealers.

Engineering Calendar

American Railway Master Mechanics' Assn.
American Institute of Electrical Engineers.
Master Builders' Assn.
American Society of Heating and Ventilating Engineers.
Association Iron and Steel Electrical Engineers.
Mining and Metallurgical Society of America.
Society of Automobile Engineers.
Illuminating Engineering Society.
National Electric Light Assn.
National Gas Engine Assn.
American Society for Testing Materials.
American Institute of Metals.
American Foundrymen's Assn.
Society Naval Architects and Marine Engineers

MARCH

8—Illum. Eng. Soc. New York section, Auditorium Consolidated Gas Co., 8 P. M. Maintenance of Residence Lighting, H. H. Newman. Development of Lighting Fixtures, P. L. Zoellner.
8—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penna. section at Phila.
9—Amer. Inst. Elec. Engrs. at Hotel Sherman, Chicago. Relays for High-Tension Lines, P. Torchio; Protective Relay Equipment on System of Commonwealth, Edison Co., R. F. Schuchardt.
9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
10—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
12—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
12—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
13—Amer. Soc. Mech. Engrs., New York Section, Eng. Societies Bldg., 8.15. Mobile Armaments, A. M. Coyle. Informal Supper, Hotel Navarre, 6 p. m.
13-14—Soc. Auto. Engrs. Council meeting, Hotel Traymore, Atlantic City, N. J.
15—Mining & Met. Soc. of Amer. monthly meeting N. Y. section at Engineers' Club.
15—Soc. Auto. Engrs. Metropolitan section. "Pleasing the Police" or the Headlight Glare Problem by A. L. McMurtry.
16—Soc. Auto. Engrs. Detroit section, Hotel Ponchartrain, 8 p. m. Chassis Lubrication, R. Chilton.
17—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.
19—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.

APRIL

7—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
12—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penna. section at Phila.
12—Illum. Eng. Soc. New York section. Projectors, C. A. B. Halvorson, a paper on industrial appliances.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
14—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
16—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
19—Soc. Auto. Engrs. Metropolitan section. "Driving the Car Magnetically." A paper on the Owen system by W. Goll. A paper on the Woods system by W. P. Kennedy.
19—Mining & Met. Soc. of Amer. monthly meeting New York section at Engrs. Club.
21—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.

MAY

5—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
8—Soc. for Elec. Development annual meeting.
12—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
14—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
15—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
17—Soc. Auto. Engrs. Metropolitan section. "Engines that Will Burn the Fuels We Shall Have to Use." Papers by H. G. Chatain on the Diesel and P. O. Scott on the Junker.
17—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penna. section at Phila.
17—Mining & Met. Soc. of Amer. monthly meeting New York section at Engrs. Club.
18—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
19—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.
21—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
21-24—Amer. Soc. Mech. Engrs. Spring meeting in Cincinnati. Joint session May 22 with Nat. Mach. Tool Bldrs. Assn.
29—June 1 — Nat. Elec. Light Assn. Convention at Atlantic City.

JUNE

2—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
5-7—Nat. Gas Engine Assn. annual meeting at Chicago (Sherman House).
8—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
9—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
11—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
11—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
12—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
13-14-15 — Amer. Ry. Master Mech. Assn. convention, Greek Temple, Atlantic City, N. J. Hdqrts. Marlborough-Blenheim Hotel.
14—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penna. section at Phila.
15—Illum. Eng. Soc. Pittsburgh section, Office Building, Lighting and Inspection Trip through City and County Building. Mr. S. G. Hibben.
16—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.
18-19-20 — Master Car Bldrs. Assn. convention, Greek Temple, Atlantic City, N. J. Hdqrts. Marlborough-Blenheim Hotel.
21—Mining & Met. Soc. of Amer. New York section monthly meeting at Engrs. Club.
26-30—Amer. Soc. for Test. Mat. annual meeting Atlantic City.

JULY

7—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
10—Amer. Soc. Heat & Vent. Engrs. monthly meeting Mass. section at Boston.
12—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penna. section at Phila.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
14—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
16—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
21—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.

AUGUST

4—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penna. section at Phila.
10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
11—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
14—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
20—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
21—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.

SEPTEMBER

1—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.

10-14—Assn. Iron & Steel Elec. Engrs. annual convention at Phila.
8—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
10—Amer. Soc.. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
11—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penna. section at Phila.
14—Amer. Soc. Heat & Vent. Engrs. monthly meeting Ohio section at Cleveland.
15—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.
17—Amer. Soc. Heat & Vent. Engrs. monthly meeting New York section.
20—Mining & Met. Soc. of Amer. monthly meeting N. Y. section at Engrs. Club.
24—Amer. Inst. Metals at Boston.
24—Amer. Fdry. Assn. annual meeting at Boston.

OCTOBER

6—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
8—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
11—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penna. section at Phila.
13—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
15—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
17, 18, 19—Amer. Gas. Inst. at Washington, D. C.
18—Mining & Met. Soc. Amer. monthly meeting New York section Engrs. Club.
20—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section,

NOVEMBER

3—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
8—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penna. section at Phila.
9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
10—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
12—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
12—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
15—Mining & Met. Soc. Amer. monthly meeting New York section at Engrs. Club.
15, 16—Soc. Naval Arch. & Marine Engrs. annual meeting.
17—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.
19—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.

DECEMBER

1—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
8—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
11—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penna. section at Phila.
14—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
15—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.
17—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
20—Mining & Met. Soc. Amer. monthly meeting New York section at Engrs. Club.

Industrial Miscellany

Duplex Truck Co., Lansing, have given a contract to prepare plans for the $1,000,000 plant which the Duplex Co. will erect on a tract of 15 acres, recently acquired.

Acme Tire & Rubber Co. will build a plant in Oakville, Ont., for the manufacture of rubber tires and goods.

Hayes Mfg. Co., Detroit, has co-operated with the Society for Saving to give its employees the opportunity of opening saving accounts from which money may be realized for acquiring homes of their own. J. Gavsztecai, manager of the company's welfare department, has been appointed a cashier in the society with a branch in the factory.

Miller Auto Sales Co., Grand Rapids, Mich., will manufacture a new truck unit to be known as the Mil-Ton for which it will act as state distributer and assembler. To properly finance the undertaking, changes were made in the company and W. C. Miller was made president and general sales manager; L. W. Coppeck, formerly of the Decatur Truck Co., vice-president, and L. A. Corcora, secretary and treasurer.

Brazil Motors Co., Brazil, Ind., recently incorporated to manufacture a front drive truck, for which patents now are pending, last week bought a large plant, and announced the place will be put into repair as soon as possible and machinery purchased for the beginning of operations.

Ford Motor Co., Detroit, is now using 9½ lb. of brass and 8 3/10 lb. of copper in each car, and since the company plans to build close to 1,000,000 cars in 1917 these figures will mean a total reduction of 3,000,000 lb. in its annual needs of copper. The company used 11 3/10 lb. copper in each car in 1916.

W. H. McIntyre and E. Guanlett are discussing a deal with the Toledo East Side Commercial Club for the erection of an engine factory. Mr. McIntyre and Mr. Guanlett are the inventors of the engine.

Holihan Mfg. Co., Detroit, maker of metal parts for automobiles, is moving into a new plant which the company has just erected.

Budd Wheel Corp., Philadelphia, formed several months ago to manufacture steel and wire wheels, is now in full sway and is shipping wheels. W. B. Read, secretary of the company, states that orders on hand will keep the plant running to capacity for the next six months or more. The present quarters are proving inadequate to meet the demand.

Terwedo Mfg. Co., Oshkosh, Wis., has engaged in the production of automobile, truck and tractor radiators and cooling systems.

Kellogg Mfg. Co., Rochester, N. Y., is about ready to start production in its factory addition. Considerable remodeling and changing has been done which both increases the space in shipping room and offices.

Federal Rubber Co., Milwaukee, Wis., is planning an addition to its power house costing $200,000.

Jamestown Auto Parts Mfg. Co., Jamestown, N. Y., plans to erect a two-story addition.

Huntington Tire & Rubber Co., Huntington, W. Va., will complete its plant by April, on which date it will be ready for operation.

Comet Automobile Co., Decatur, Ill., has contracts for the first consignments of parts for assembling Comet cars to be placed upon the market. Ground will be broken soon for the plant.

Studebaker Corp., Detroit, will move the advertising and sales departments to South Bend, Ind., about April 1. The company has always maintained its executive offices in South Bend, and is making this move to secure greater concentration of the administrative forces.

Parsons Mfg. Co., Detroit, will erect a new factory on a 1-acre site, recently purchased at Springwells, near the new factory of the Saxon Motor Car Corp.

Personals

F. A. Snow, for 5 years chief metallurgist of the Thomas B. Jeffery Co., Kenosha, Wis., and its successor, the Nash Motors Co., has resigned to engage in business on his own account as a consulting metallurgist and to establish a commercial heat-treating plant in Chicago. He will leave Kenosha on Feb. 1.

Orville Lawson, of the Inter-State Motor Co., Muncie, Ind., has been transferred to the exporting branch of the factory, which has its offices in this city. Mr. Lawson's first assignment from the local office will probably be Cuba, the West Indies and a part of South and Central America.

Mel Stringer has been appointed general sales manager of the Keller Engineering & Sales Service, Chicago. This company will handle the entire output of the H. A. Miller Mfg. Co., Los Angeles.

A. C. Faeh, formerly advertising manager for the Baker-Rauch, Lang Co., maker of the Owen-Magnetic cars, has resigned to become general manager of the Osgood Lens & Supply Co., Chicago. Mr. Faeh had been affiliated with the Baker-Rauch, Lang Co. for more than 10 years.

David Olney has been made cost manager of the Ohio Electric Vehicle Co., Toledo.

F. R. Carroll has been appointed as district manager here for the B. F. Goodrich Co. Mr. Carroll has been in charge of the branch in Los Angeles, Cal.

C. Earl Dawson is again in Detroit in the position he formerly held as factory branch manager for the Chevrolet Motor Co. He has recently been wholesale supervisor.

W. C. Lacy, assistant branch manager of the Studebaker branch in Dallas, Tex., has been promoted to district manager at El Paso. Iver Schmidt, assistant branch manager at St. Louis, has been transferred in the same capacity to Dallas. Edward McCarthy, formerly vehicle manager at Dallas, has been appointed assistant branch manager of the Portland, Ore., Studebaker branch.

Nelson Gotchell, formerly with the Chandler Co., is now sales manager of the Northwest for the Smith Motor Truck Corp.

H. T. Ames, of the general sales department of the Sexton Castor Motor Oil Co., Chicago, will take charge of the Detroit office of that company as soon as opened here. The Sexton Co. has increased its output from 20,000 gallons per week in 1916 to 600,000 gallons per week at the present time, and has opened more than 20 factory branches.